

RECORD

Book #73

11-14-15

Book 73 list has nothing

81-14

(1001.01-1002.01 year)

(2004 - 2104)

.....assembled, checked with other book

201-5

.....assembled, checked with other book
.....assembled, checked with other book

20-41

.....assembled, checked with other book
.....assembled, checked with other book

16-52

.....assembled, checked with other book

20-53

.....assembled, checked with other book
.....assembled, checked with other book

20-54

.....assembled, checked with other book

21-40

.....assembled, checked with other book
.....assembled, checked with other book

21-41

.....assembled, checked with other book

21-42

.....assembled, checked with other book

21-43

.....assembled, checked with other book

.....assembled, checked with other book

Collection and Field Note Book

No. 73

(May 10, 1964 - July 19, 1964)

(45215 - 45683)

Air trip New York to Caracas.....

Pages
1

Venezuela

Caracas to Maracay.....2-4
Short trip by auto into hills-
Villa de Cura.....5
Bus trip to Puerto Perito....7-11

Specimens collected

East of San Sebastian.45215-45219... 12-13
Puerto Piritu..... 12-13

Trip by bus out of Jusepin.....

22-41

Specimens collected

Southeast of Maturin.45220-45230... 42-43
South of Rio Tigre...45231-45236.... 42-45
Between Rio Tigre and Rio Guanipa 44-49 45237-45254
West of Punto de Mata.45255-45258a... 48-49
La Ceiba45259-45261.... 48-49
Between La Ceiba and Santa Rosa 50-51 45262-45265
North of El Tigre ..45266-45276.... 50-53
West of El Tigre ...45277-45280.... 52-53

Bus trip San Torne - El Tigre.....

54-69

Specimens collected

West of Pariaguan....45281-45285... 70-71
East of Taguapire....45286..... 70-71
West of Chaguaramas .45287-45288.... 70-71
Northeast of Calabozo 45289-45290... 72-73
Projecto Guarico45291-45292... 72-73

Bus trip Calabozo south to San Fernando
de Apeuie.....

74-84

Specimens collected

South of Projecto Guarico.45303-45305...

86-87

Camaguan.....45306-45311...

86-87

La Guama.....45312-45321...

88-89

Estacion Biologica de la Sociedad de Historie
Naturel de Venezuela..... 90-93

Bus trip Calabozo to Maracay 5/19..... 94-100

Specimens collected

45322-45338

Estacion Biologica Reserve near Calabozo.. 102-105

Puerto Rico..... 106

(Air trip Caracas to New York)

Virginia

Alexander Berger Memorial Sanctuary.... 110-115

Specimens collected

Virginia

Fairfax county.....45339-45344... 108-109

(Great Falls, Sleepy Hollow) 45680-45683 184-185

Spotsylvania County.....45347-45429 116-127

Shenandoah National Park45431-45555 130-151

45616-45639 170-173

Frederick County, 45556-45593 45640-45679 176-183

(Trip 152-156)..... 158-163

Pennsylvania

South of Berlin.....45594-45598 166-167

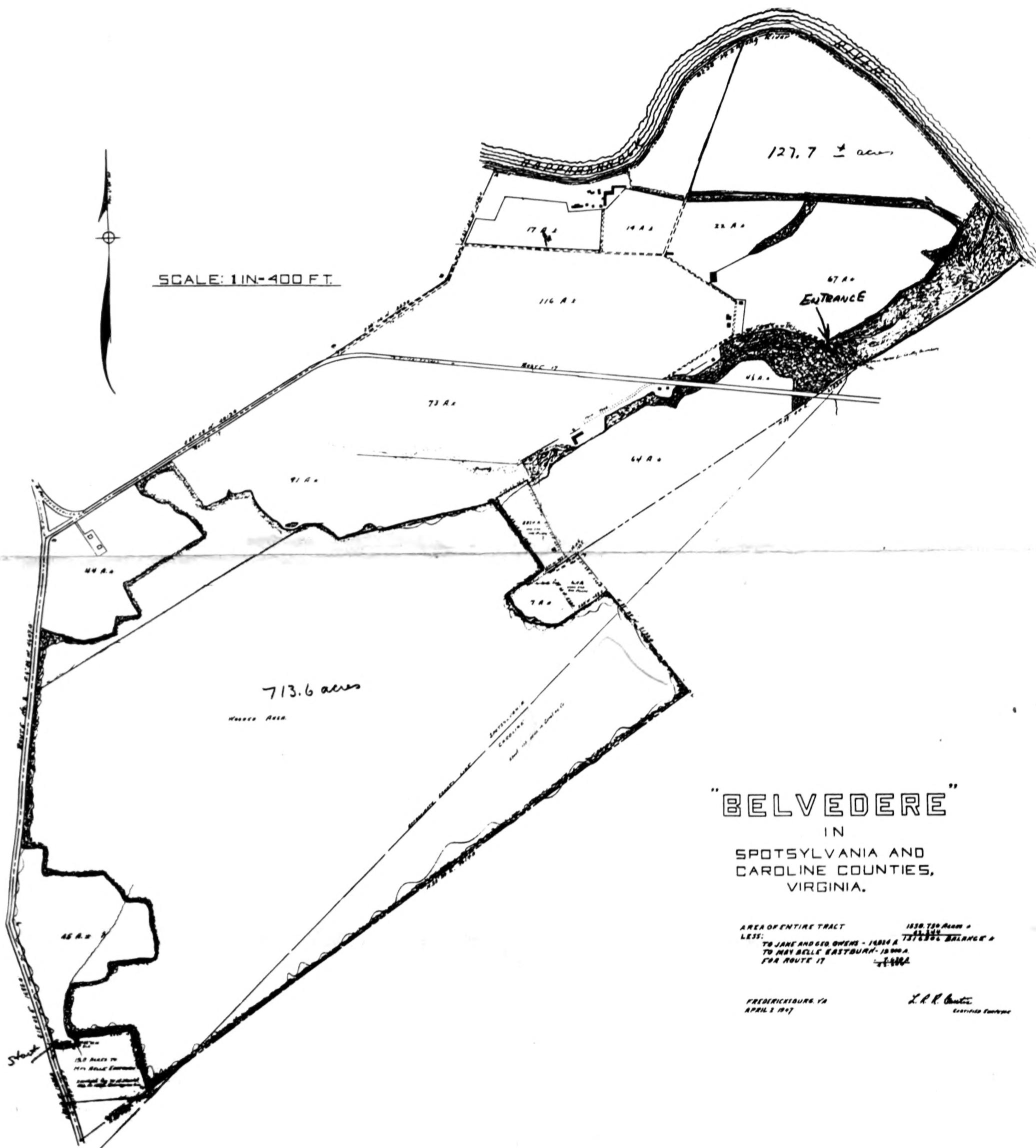
Maryland

Garrett County.....45599-45615 166-169

(Finzel Swamp) 165

District of Columbia (Smithsonian) 45430. 128-129

Virginia -- Alexander Berger Mem. Sanctuary.. 110-115



Book # 73
Begin 45215
End 45683



Standard Miniature Blank Book

No. 665 9½ x 6 120 Pages Units

No. 667 9½ x 6 200 Pages Units

No. 668 9½ x 6 300 Pages Units

Made in the Following Rulings

Journals, Day or Cash Books, Double \$ and Cts.

S. E. Ledgers, \$ and Cts.

Double Entry Ledgers

Records with Margin Line

When ordering give Number and Ruling desired

Made in U. S. A.

1964

1

May 10 - Arrived N.Y. to
Caracas.

left 4:30 p.m. arrived 8:30 left side
at 7:00 p.m. two rather small
islands - rather triangular
in shape. largely scrub-
covered. First with fairly
large bare area, northern
one with a small lagoon
in its north end, appear
very flat. Not very green.

7:15 Hispaniola - true
visibility very poor.

May 12 - Caracas

Mangifera indica
Euphorbia cotinifolia
Canarium zeylanicum
Euphorbia pulcherrima
E. tithymallii

May 17 - Caracas to Manacay
- by bus.

Just out of Caracas the hills are covered by small bushes. Some trees and other plants among them. Upper parts of higher hills brush-covered.

First hills are covered by a deciduous thorn scrub with a very liberal scattering of green *Yucca* and *Agave*. A few green bushes. The *Yucca* and *Agave* very soon disappear or become scarce. Vines abundant. Hills are formed of thick bedded shales or schists, very much distorted.

As we climb, the scrub becomes greener. Near summit a degraded evergreen ~~for~~ scrub forest. Summit ridges a mixture of low shrubs and *Pteridium*, some *Gleichenia*. Top area appears to have been burned and is almost continuous *Pteridium*.

Some new burn scars on the upper w. slope. On this slope some ridges are grassy. Melons,

wigandia on rocky out.

On this slope the evergreen belt is less developed, mostly in ravines. Much more burning here.

7 b/w photos of a very degraded hill with *Pteridium* & scattered bushes near Los Teques.

Beyond here the hills are extremely denuded and much burned over. Only scattered patches of woody vegetation.

Ciceropia very common in wooded patches.

A little farther down the woody vegetation becomes deciduous. The cover becomes more abundant, but is spiny & microphyllous. A thorn scrub forest. Some large patches of grass.

Lower hills a patchwork of shifting cult. and thorn forest. In valley bottoms *Passiflora*, etc. and cane fields. Some *Quadua*. Hills are more and more covered with thorn forest, little clearing.

Photos in valley bottom of cane field and thorn forest on hills.

On lowest hills is *Curatella* savanna - *Curatella* shrubs or small trees more or less evenly spaced, in place almost close enough to be called open scrub. The grass between is burned down to basal tufts.

Much soil showing.
One photo from bus.

Here the savanna can scarcely be due to impeded drainage, as slopes are up to 45°.

Flat plain is largely cultivated - bananas, etc. around periphery, cane more common toward interior. Scattered large trees, mostly banana.

Trees & *Guadua* more abundant along field boundaries.

Some large areas evidently too dry for cultivation & not suitable for irrigation, with sparse coarse grass and ~~soil~~ scattered large banana areas, locally close enough together to be called forest, mostly must be called savanna.
This part outside Maracay.

May 14 - short auto trip up into hills on road to

Hills completely denuded except for thin strips of ~~forest~~ evergreen forest in ravine bottoms otherwise covered with a savanna vegetation of *Curatella*, *Brysonima*, etc. widely spaced, with a ground layer of *Molinis*. The bushes become more sparse on upper slopes.

The road goes up from Maracay over an alluvial fan of great boulders. The hills are granite.

In the main ravine the prominent tree is *Anacardium excelsum*. *Mangifera* common, also.

Cowes' hill, heavily grazed, covered by scattered trees, a few cacti. Thickets in ravines. Tree mostly green. In places lower story is grass, in places of a more or less microphyllous scrub.

Villa de Cura - grazing pattern very conspicuous on hills. shrub savanna.

May 14 - trip by bus to Puerto Víriti.
 Lago de Valencia - very narrow marshy fringe with grass and *Eichornia*, etc. No tall emergent plants. Some plantations of *Musa nana*, some sugar cane. As we approach hill, the ground slopes up slightly. Pasture with scattered trees. Many *hamanoa*. Roadsides lined with trees & shrubs.

(Inset from p. 5)

Beyond Villa de Cura is a pass through the mts. of flat bottomed valley. Scattered large trees. Some ~~total~~ bottle trees. Road lined mostly ~~total~~ with *Glicicidia sepium*. Hills become more wooded, but very irregularly. Mosaic of wood & savanna.

Then hills more and more eroded ~~and~~ overgrazed and bare. Cultivation and trees in valley bottom. Dry on aspect.

Los Monos de San Juan (San Juan de los Monos) striking limestone peaks. Dry savanna on surrounding hills of mica schist, severely burned. Some fire scars. 5 photos of monos and savanna covered hills. Upper slopes, below cliffs, of monos, forested.

near San Juan the savanna slopes are ~~less~~ more luxuriant, but typical *Bassiniina*-*Canalill*, ^{ravine mouth} savanna. Thickets in ravine bottom incl. large trees. *Spondias*, *Anacardium*, *Mangifera*, *Glicicidia*, *Cecropia*, *hamanoa*, etc.

At San Juan, turned east in a large valley. Some relief in bottom, this covered by savanna. Flatter places cult. Banana, mangoes, breadfruit

Lower slopes with savanna, thickets of *Acacia*, other legumes, *Spondias*, *Cecropia*, etc.

Much of this newly burned. Erosion severe.

Then lower hills with semi-deciduous scrub or scrub forest or open scrub forest.

flanking agriculture.
A limestone crest on
left, very rugged,
slopes above and below
cliffs wooded.

Lower hills with a
semi-open scrub forest,
semi-deciduous, with
Guazuma, some cult.

Flat bottom ravine of
a pastured, local patches
cult. If hole aspect rather
dry. Patches of tawny
grass on hills, mostly
wooded, though.

Creek with water.

San Sebastian -

Then in rolling & hilly
valley bottom a mosaic
of savanna and deciduous
or semi-deciduous scrub
or scrub forest.

Mursera, Acacia, Prosopis,
etc. many species. Many
vines. Some hills very
bare.

P. On plateau in valley a sparse
thorn scrub of Acacia spp.
Here in thickets is Jatropha
introd.^{sp.} (cf. carcas), Psidium sp.
Then extensive savanna
of Hyparrhenia mps with
scattered trees of various
sizes and kinds.

Small incised stream.
(near Granja Alta Gracia)
just before fork in rd.
San Casimiro left Alta Gracia
rd. Some of this shows
grass to 1-1.5 m. tall, other
large areas burned
gallery forest of many
species of fairly large
trees - Anacardium,
Enterolobium, Guazuma,
Samanea, Muntingia,
Cecropia,
San Casimiro

Rio Tuy. - deep ravine
more flat ground on
bottom

slopes denuded except
for steep wooded ravine.
Grazing pattern heavy.
Much burning. Upper
slopes and ridges without
scattered shrubs, lower
with them. Road follows
ravine. Where ravine
is narrow, thickets where
broad cult. & clumps
of Guadua, Cyathinas.
Some Cyperaceum along
stream and on a few wet
slopes. Manioc & bananas
cult. on slopes.

Hills are of schist.

Now there are higher hills

that are wooded near top of coffee plantation with native shade trees in valley bottoms or lower slopes much banana cultivation. Guadua locally abundant. Lower hills with tall almost closed deciduous scrub. Also badly burned scrub. Considerable area of this but with patches of grass. In plain grass covers most of area esp. on steep slopes. Caratella with it locally. Clover about 45°. Now in drainage of Rio Tuy. Deciduous scrub and scrub forest.

Tangled nests hanging from trees, made of huge thorns. Gallery forest of large woody trees in ravines.

Muntingia common. Coming out into very broad valley hills have deciduous forest with some *Cereus*.

Cua.

Valley rolling and largely cult. except rougher spots. scattered trees and hedgerows ~~charcoal~~.

Monte real

100 curtain del Tuy. Savanna on rolling stony ground. Thicket in depression wider depressions with cult.

San Francisco de Yare.

A large low flat area of microphyllous thorn forest, flat topped Acacia. Rolling land with very open scrub, and some hills with bar deciduous forest on patches. Some cultivated (fallow) or bare pasture. More lead bare trees.

Then more relief and hills mostly covered by low deciduous forest.

On left a great valley bottom with cultivation. Hill with deciduous forest on other side.

Some savanna on rolling ground but deciduous forest separates from it by a fence.

Some low spots with rather widely spaced large spreading deciduous trees.

Santa Teresa.
Crossed Rio Tuy.

May 14 - east of San Sebastian,
Est. Aragua

45 in thorn scrub
 5215 *Jatropha*
 thicket
 1 16 *Acacia manacantha* sub stejnegeri 1980
 common
 2 17 *Acacia manacantha* " occasional

May 14 Puerto Piritu,
Est. Anzoategui 1.m.

on sand flats ~~is~~ along
 strand just back of beach.
 1 18 *Alternanthera*
 very common

1 19 *Calotropis procera* (Ait.) G. & J. m. late fl.
 common

shrub 4 m. tall, bark
 thin, peeling, brownish.
 shrub 2 m. tall; flowers
 orange yellow.
 small tree 5 m. tall,

very prostrate,
 forming loose mats,
 glaucous.
 shrub 1 m. tall,
 glaucous, flowers
 pale purplish.

Bottomland forest deciduous, or semideciduous.

Then rather steep rugged hills with deciduous forest or dec. scrub, evergreen forest in bottoms of deep ravines, esp. along Rio Tuy. Cedro, Tabebuia, Hurac, Drago? *Cecropia*, *Prosopis*?, are common tree species. Hills are much burned, some denuded of trees. This more and more as we go down river.

There has been no *Curatella* savanna for many miles, none here. Most hills are mostly bare, grassy or the grass usually burned off, only a few scattered fairly large trees, and thicket in ravines. Some slumping on steep slopes.

Crossed large tributary. A few tiny patches of wood left on hills, otherwise few even scattered trees. *Ochroma*, except gallery along ravines.

Now, suddenly, the hills are somewhat green, from young growth of grass. Here, at least, *Panicum maximum*

floras now with green thicket. Much *Ochroma*, *Cecropia*, Drago, Vertes, forming a 'fairly good' secondary forest, with thick undergrowth. *Heliconia*, *Lantana*, *Pithe*, *Cupatorium* cf. *odnatum*, *Veronica*?, *Gleichenia* (rare) *Mimosa*, large aroid, *Miscanthus*-like grass on road cuts, *Vismia*.

Many vines ^{and more ground} on larger trees that are relict of older forest, not on the *Ochroma* or *Cecropia*. (stems of *Gymnostoma* must indicate steepage)

Parque nacional de Guatopo summit - Los Alpes del Tuy. Montane rain forest, rather degraded but dense and luxuriant. About 300 m.

I 20° rainfall ± 30"

Down from here, thick montane rainfall. Much Balsa on left slope, less disturbed across ravine on right.

Forest rapidly assuming a more *Geoffreytic* aspect as we go down, but some

and *Ochroma* remain common. Cuttings occasional. Many vines. Hills begin to be cleared and grassy. Cross Río Tuy.

Cyathurae poeppigiana shading cacao & bananas.

Much *Quadua*. Enga from other tree in shade, too.

Then irregular secondary forest in broad valley, alternating with banana patches with some shade. Then more or less grassy hills. Cacao plantation on flat ground. *Gymnema* flowers.

Out into rolling country, partly in grass, patches of wood, thickets, cult. patches, patches of *Thalia geniculata*.

Crossed bridge to main highway.

Hills now dry & grassy, in Encrucijada, near *Acaguas*.

Grassy hills with groves of *Acacia*. Thickets of *Triplochiton americana*. Hills become more and more wooded. Low rolling land

grassy with thickets and scattered trees. Hanging out of a ridge covered with vines.

Hills parts west have many fires. Many burn scars along road and in nearby hills. Mixtures of thickets and openings on rolling hills. *Gymnema* along stream and in wet spots. Some is burned. *Quadua* also.

Bardowekii was here 15 years ago and it was unbroken rain forest. Now completely degraded. Some cacao 80-90" rainfall

Road to Higuerote to left.

racemosa *Pitcairnia pacifica* cult. *Tabebuia* cf. *pentaphylla* (in fl.) as cacao shade. Much cacao here. Bananas also.

To east on coastal plain degraded vegetation: cult. patches banana, cacao, swamp with *Gymnema*, more cacao than anything else.

Some coconuts. Much tangled thicket.

Libocedrus orchard.

San José de Río Chico.

East on coastal plain
a complex of thickets, large
trees, patches of bananae,
swampy spots, patches
of secondary forest, some
coconut trees, rice. Roy stores
(apparently spontaneous)
Crossed river.

Then some open areas,
mostly growing up to
scrub of varying heights.
a little cult. some rather
big pastures, cocao
plantations. Grading.
Gymnium. These line
watercourse. Much
cacao, locally breadfruit
& mangoes, some very
large. A yellow tafetia.
El grape.

Forest increases in
proportion eastward, but
is being cleared rapidly.
Ecocoria abundant
along road. Mostly
secondary brushy. Some
degraded primary. Schiedea
common. also Triplaris.
Every stage of degrada-
tion. Hololeia locally one
of dominants.

Then country becomes
more dissected but not
higher. Veg. is an open

deciduous or semi deciduous
forest with a close
tangled under-story.

Then a very large, flat
savanna of bluish
grass and scattered large
trees, partly evergreen
(Chamane,) partly deciduous
(Tibouchina).

Then hills with
deciduous forest. Buses, etc.
Crossed river. More sav.

Very wooded hill on rt.
or savanna on left, middle

Then ~~at~~ ^{at} but distant
and apparently for a few
coconut plantation.

Then hills and
flat covered by deciduous
scrub forest, very white
tangled, somewhat spiny,
some arborescent cacti,
Bromeliads on ground, some
Tillandsia usneoides on
some trees. Plus tos of
general aspect and close
up (b & w), on coast ~~mostly~~
bet. Cupua and Bocade
Uchire. Prosopis, Caesalpinia
crassia (dividiv) with
epiphytes. Clethra.

Prosopis largely dominant.
Cacti, esp. Opuntia, more
abundant eastward. A few

arched glaucous species
of *Opuntia* with narrow
joint common in openings
in bare ground.

Around large lagoon
a broad zone with no
vegetation. Around
this a narrow to broad
belt of *Batis*. In this
zone scattered *Avicennia*.
Locally *Cereus* sp. (columnar)
growing in *Batis* flat!

The *Avicennia* is outside
the bare zone.

Turned inland into
high hills covered with
the same forest.

The Brazilians say this
white forest looks like
caatinga of the Brazil.

On the other slope
of the hilly stretch
the forest becomes
more or less green,
taller, more many.
Perhaps a semi-deciduous
scrub forest.

at the base, on flat
country, deciduous
scrub forest again.

but extends for some
distance, mostly over low
hills. Trees generally
white to gray. Locally

green where *Prosopis*
dominates, but this is
largely along the road
where a broad strip
has been cleared. but few
green trees in the main
body of the forest.

large flat area, still
dominated by this same
forest, but with perhaps
more evergreen trees
scattered in it. occasional
large areas cleared.

Calotropis common on
bare cut, and banks
along road and pipe line
turn-off to Puerto Píritu.

strand at Puerto Píritu -
a sand flat behind
a very slight beach
ridge of quartz sand, fine.
Few plants:

Alternanthera

Calotropis

Cynodon dactylon

Tribulus terrestris

Boerhaavia cf. *repens*

Prosopis cf. *juliflora* (prostrate)

Thespesia populnea (planted)

May 15 - Traveled by bus out of Iquitos.

Savanna in immediate area of Iquitos has scattered shrubs but few trees, grass grazed short, but closed. Distribution of shrubs very uneven, becoming more conspicuously spotted as we progress - the spots becoming open scrub in places.

Broad ravine of Rio Guarapiche wooded with a complex of thickets of mostly deciduous (perhaps about 70-75%) trees & shrubs, and savanna and open scrub patches. A slender upright bamboo is very common - clumped.

Followed this river valley for a time - to La Toscana

There are various small farms in the ravine and outskirt of La T.

Beyond La T. veg. varies from grassland with scattered shrubs to open scrub and thickets. Many small farms along road. Gallery forest along watercourses & ravines.

Considerable evidence of burning, some recent.

Then considerable open savannas.

Turned right at Hotel Iquitos. On immediately to go south, through plains with low grass (grazed) and a few scattered shrubs. Then a settled area near a ravine. In this ravine a gravel pit shows cross bedded gravel and sand, a thick layer of fine sand and silt which is red below, shading to yellow gray and gray above. The gray color perhaps due to charcoal. In place overlain by red sand possibly artificially placed there. Lat. noll. 1-0-1. This is obviously a relatively recent terrace deposit compared with the "Upper Llanos" surface on both sides. It has come about under sufficiently pluvial conditions to get a typical terrace deposit, gravel below and fine above, and long enough ago to have a soil development: blackish to gray to yellow gray to massive red (silty sand) (to bedded sand.)

This broad river ravine covered by farms and degraded forest.

Town of Maturín just south of river, savanna on plain.

South, a mile or so, in a vast plain with no tree

1300-1,400+ mm precip. strongly seasonal

(May) June - Aug. most rainy dry period Sept. - May, but some rain Sept. - Jan.

Water table shifts markedly. This is called part of Lower Planos. Organic matter disintegrates rapidly.

The area has been used by for livestock for a long time. Soil fine, gray for 9+ dm turning yellowish.

~~Acacia~~ grass tuft, 8-11(2) cm apart, burned to within 3-5 cm of ground. This with little else forms matrix in background. Scattered anthills with or without tiny *Cnemidophorus* to 25 cm. tall. These bring up the yellow subsoil, as they are bright yellow. In these are spots of richer vegetation marked by *Hippocratea* sp. and *Andropogon* sp.

90 m.

Profile ^{very} fine sand
A1 gray at surface
A2 lighter gray, pH 6
B1 yellowish 7.0-8.5-9
B2 reddish pH 8.5-9
This root

Up-areas

Andropogon cf. yellow

Elyonurus

Eleocharis

Paspalum

Axonopus

Melinis

Brachypodium

Various legumes have tuberous roots.

Stylosanthes

Indigofera

From here on - first some more typical savanna with *Curatella* etc. Then a large depression with *Mauritia* and other trees.

More savanna. Then a large river with disturbed and more or less undisturbed gallery forest. Cut patches of manioc & bananas.

Then savanna again. Then lots of great area similar to that experienced.

with only tiny curatella.
Enormous area of this
with very widely spaced
patches of wood and
very occasional isolated
trees, with much fresh
burning locally.

Crossed another river with
gallery forest.

Then open area with
abundant curatella not
more than 15-20 dm. tall.

1-2 m apart - becoming
less abundant as we go
on. A very few wooded spots,
but much on horizon.

Then a large "morichal"
stopped here. It
occupies a depression of
several m. depth, muddy
in bottom, the palms
surrounded by a muddy
area of rank herbs and
suffrutescent herbs to 2 m. tall.

Various sedges, ~~Styx~~ *Ludwigia*,
melastomes, grasses, etc.

South of this a vast
slightly rolling completely
open area, no trees even
on the horizon. Tiny curatella
abundant, 1-3 dm. tall, generally
short grass, some fresh burns.

Photo
N. & S.
(beginning)
V. & W.

Then an area of shrub
savanna with shrubs
0.5-1 rarely 2 m tall.
Locally dense scrub,
forming a mosaic.
patches of open Marilia,
then dense morichales
occupying a considerable
area sloping down to a
depression with a grassy
swale, then a river.

Rio Morichal Bargo.

On other side of this an
immediate escarpment
of at least 15-20 m. or more.

On top of this more
open area with abundant
dwarf curatella.

Curatella slightly larger
outside the fence, along
road. Area completely
open - to great several
miles away or beyond the
horizon. Then a small
patch or two closer to road.
Recent burns with dead
curatella shoots.

Some small ponds but
mostly in artificial pits.

Tonight no trees as far
as one can see. On left
a forest (gallery) on the right.

This relation extends for
some miles. The "treated" area

most amount to many sq. mi. doubtless if the shrubs are destroyed once they are kept down by frequent burning.

Where there are borrow pits in this region the red soil begins only a few inches down. But this should be checked in fresh holes.

A small coconut plantation near village. Looks over village called Temblador (electric etc).

Beyond this, a vast treeless area. Then the Temblador compound of Creole Co. where we had lunch.

Return trip -

Some areas where, after a recent fire, *Brysonina* a few inches tall is the only plant remaining.

Northward from Temblador the gray layer seems to be much thicker than the few inches at in the Temblador region.

Galleria forest along Rio Monchito large & tangled mass of Ficus, *Mauritia*, etc. with

Heliconia and many lianas, ferns such as Blechnum on floor. A great layer on ground, from 8 cm to very thick on white sand. The canopy is irregular, up to 15 m high.

In river are *Eichornia*, *Pistia*, *Salvinia*, *Agolla*, and an enormous thickness *Hydroclea*. A bit of *Montichardia* in a nearby place.

North of river the gray or yellow gray layer is again only 1-2 dm. thick.

Monichales tend to be surrounded by a marshy zone. An open Monichal has many dead manitias, bare holes.

Stop at a *matá* or patch of wood in savanna. The surrounding plain is covered with broad grass with spaces filled by an *Eragrostis* scattered about of *Brysonina* & *Curatella* with heavy root crowns. *Borreria* next common. Other herbs less so. The patch of woods is of secondary nature,

including *Vitex*, *Desmoncus*,
various secondary species,
surrounded by a zone of
Anacardium with
its leafy surface slanted
outward shaded from above
by the forest trees, with little
or no grass beneath them.

Doubtless shaded out inward
but persisting on edge.
Being fire resistant the
Anacardium mountain
itself and keeping the grass
down, protects the interior
more fire susceptible trees
from fires.

Since the mata flora is
secondary, it may be
an indicator of a former
patch of better forest, a relic
perhaps. People would have
cut it and raised a crop of
or of corn, abandoned it, and
it would have reverted
to secondary forest, leaving
a "pseudolandscape" of the
former forest patch.

Baccharis
capitata

Further north, across
a river, are some pools
of water, also water in
boggy pits, indicating
that the water table is very
near the surface at least
locally.

Not far south of the Mata in
is an extensive area with
scattered large umbrella
crowned trees of various
species, probably relicts of
the former forest. In one
area these are close enough
to form an open or semi-open
forest, with much bamboo.
This may be similar to the
original forest of the region.

May 10 - Jusepin area - the
upper terraces are principally
covered by *Crotonella* savanna
the ravines and slopes
by thicket.

From here west on
main road toward La Ceiba
In valley bottom near
Jusepin where forest is
replaced by thicket
the thicket seems to have
a much more xerophytic
aspect than the forest.

Walk up on the terrace - said to be "lower flanne"; Curatella savanna seems general, but the Curatella has apparently been cut at some time in the past, as it is mostly not more than 1 m tall, or very locally taller. The grass is generally a bunch-grass (*Axonopus*?) 0.5 m or usually less, tall locally recently burned. Abundant patches of *Hyptis suaveolens* with dry inflorescences to 2 m.

A few miles west we seem to be on upper slopes of a very wide river ravine. Here the Curatella and *Brya ebenina* are much more abundant and taller, ranging up to 3 m tall, with very gnarled aspect. Locally close enough to be called open scrub. Farther down in ravine is rather low gallery forest. The scarp on the south side is steep and abrupt, but rather dissected.

El Tejera

Curatella savanna again, rather low but some shrubs

P

to ~~4~~ 3 m. the grass is quite short, seldom 20 cm.

Then a very large area in which there is only ~~the~~ an occasional tiny plant of Curatella. Mostly short, burned off grass. Obviously treated. After that, on south side of road more or less normal savanna, or north side no bushes.

Then a mosaic of treated and untreated land. Then large areas treated, or at least, free of bushes.

Then areas that are actually open scrub to ~~the~~ open scrub forest

Stop in an area of ~~the~~ scrub forest.

Here on slightly undulating sandy ground is a mosaic running from an almost closed growth of Curatella to 5 m tall with an underlay locally of *Croton* locally of *Casuarina silvestris* with some admixture of *Ganthoxylin* + several other shrubs, to an open scrub forest of same composition

but without Crotalaria
locally with it, and with
with some scattered grass.
It an open scrub of
which is a fire-resistant
thing all are Curatella
in ~~both~~ are Curatella
of very good size.

Cochlospermum
Adenanthera
Vitex
Zanthoxylum
Randia
Lasiandra
Casearia spp.
Crotalaria
Genipa

In the open Casearia
scrub there is no grass,
yet the base of the
jungle is charred.
Possibly annuals or
geophytes provide fuel.

This seems to be on the
bottom of a very broad
valley.

As we get back up on
plain there are disturbed
outcrops of indurated
laterite or "arrecife". This

is not a continuous
crust, lying on a
gravel with some
feruginous material.

On this is short
grass with scattered
Curatella bushes.

This plain here
is very much cut
by ravines, landslides
red. Different scarps
show different degrees
of induration. On
plain are tracts of large
laterite boulders half
buried.

This changes rapidly
to an ungrazed plain,
short grass with rather
widely scattered rather
large Curatella (2-4 m.)
(Baldowski says this
grass never reaches more
than an upper limit of 1 m.
in growing season & now
it is to 70 cm.

Curatella soon becomes
more abundant, then
much less to or almost
absent over large areas
but small outcrops of
laterite. Terrain
slightly rolling.

many large boulders
of laterite locally.
Cuts show gravel.

Very large area with
almost no curatella,
even tiny ones.

Rolling grassy hills,
very little curatella,
but in depressions a
very broad ravine it
forms open scrub,
and there are a few
remnants of gallery
forest.

Some patches of well
developed curatella
savanna on plain.

Surface soil is usually
gravel, but patches of
sand remain.

Possibly excessive burning
can avoid, remove
curatella?

Much gully erosion
locally. No gullies
may be of curatella
but tending to be richer
shrub composition.

A deep river valley
several miles wide
and perhaps 50-75 m
deep, cut in this plain
is essentially wooded.
Photos of road cut
into escarpment to
show nature of material
and of escarpment itself.

Gravel of pebbles and
cobbles up to 20 cm long
rather flattened, rounded.

This valley is generally
grassy. Wood in flat
bottom tends to be
an irregular thorn forest
with *Brotopis*, *Cereus*,
etc. and openings with
scrub, cotton, etc.

Peregrina *Copaifera*
Platyniscum

Caesalpinia
Shrub layer is mostly
not spiny - cotton &
other woody shrubs.

Near La Ceiba.

Toward Santa Rosa
in this valley bottom
a less thorny vegetation
essentially an open cotton
scrub with scattered
trees & clumps of taller
shrubs. Photos 2 & 4
This is scarcely spiny

except for *Pithecellobium*, which is common and *Cesalpinia*, which is occasional.

The opposite escarpment shows spectacular *Acacia* erosion. At top are rounded gravel hills, with *Carratella savanna*. Laterite exposures near tops.

Then eroded gravel with an open scrub similar to that in bottom of *quebradas*, but greener, perhaps more springy.

This changes to an open microphyllous thorn scrub or scrub forest.

Then parties on an almost closed forest - more or less microphyllous with *Bromelia pinguin* on ground. Statues about 8-10 m. This alternates with leguminous thorn scrub forest, and with semi open areas.

Endoshi says less rain in this whole area than where there is savanna. Need a certain amount to provide grass for burning. Overgrazing can also ~~the~~ change savanna to scrub.

Gradually climbing through thorn forest, to a plain covered by thorn scrub. ^{Monte Rojo} Biproil refinery. Continued through microphyllous thorn forest. seem still to be climbing. Oil installations throughout the area.

Thorn forest varies from open to closed, much *Pithecellobium*.

Then a few open areas with dry grass & scattered large trees - prob. artificial. Mostly thorn scrub or forest, very irregular. *Pithecellobium* is commonest tree, usually dominant.

Then *Anacardium*. South toward El Tigre through thick thorn forest, occasional clearing along highway - thorn forest ~~changes~~ changes from green to leafless and white, or slightly green. *Corn* here mixed, but mostly deciduous. A few *Cereus*.

Many vines, some climbing *Cereus*. Some areas ~~scrubby~~, *Centadora*.

Same semi-deciduous to deciduous forest, locally degraded.

On top of rolling hills forest opens to savanna, in lower spot it is thick forest, green to deciduous. Then an extensive high plain with very open savanna, with very widely scattered *Acacia*, *Curatella*, etc.

Then thicker *Curatella* savanna, then mosaic of more open and less open *Curatella* savanna.

Mauritia scattered along a shallow ravine.

Rolling flat land, mostly very open, but with desiccating depressions.

Vast sandy area with almost no trees or bushes. Locally more shrubs.

In shallow ravines the trees are closer together for all river.

Then more open grassland with few bushes. Then almost none for a distance.

Stopped at a slightly rolling area of bunch grass on very fine gray silty sand, firmly compacted, over which is drifting a thin layer of reddish sand, partly covering ground.

Photos of this showing tufted *Guibourtia*, a leguminous herb, several spp. grass. *Curatella* is abundant ²⁰ from bottom of the but there is a patch of ~~it~~ *Brysonima* toward the top of a small rise on top of which there is a small borrow pit, which cuts thru a 2 ft. yellow silt layer, very hard, over a layer of concretions.

Flora
 Trachypogon
 Axonopus
 Aristida
 Andropogon + *Carex*

In the area where the *Brysonima* form a scattered shrub layer there were backshot on the surface.

Surface is hard. Here the flora is a bit different, with *Rynchospora*.

In bunch grass there are a number of legumes *Cassia* + spp. *Galactea* + spp. *Stylosanthes* + spp. or *Passiflora quadrangularis*.

May 15 - 2 km. south^{east} of
Maturín
in open, treeless grassland
with sprouting curatella
~~strob~~ crowns.

245220 ~~Vaccinium~~ Andropogon
common in patches

1 21 Stachytapheta
occasional

1 22 Hibiscus Pavonia cancellata det. Frigell, 1977
occasional

1 23 Buchnera
occasional

1 24 Hyptis cf. suaveolens
very common in patches

1 25 (comb) Centrantherum punctatum Cass. - det. H.E. Robinson, 1974
occasional

1 26 Desmodium Lornia marajoara Huber
occasional

2 27 Waltheria americana det. Steyermark, 1980
common

1 28 (legum)
common

1 29 Andropogon
common

1 30 Andropogon
common

May 15 - about 5 km. s. of Rio Tigre,
about 60 km s.e. of Maturín
in marshy ground in depression
around a "monichal" or grove of
Manisia mina.

flowers small, pale
purple.

procumbent; flowers
bright yellow, maroon centers.
flowers blue.

dead panicles to 2 m. tall;
very aromatic.
flowers purple.

erect suffrutescent herb,
sparsely branched,
to 1.5 m. tall; flowers yellow.

in stiff clumps
in tufts

44

1964 Venezuela

45231 *Xyris*
common

32 *Rhynchospora*
abundant

33 (erizant.) *Syngonanthus caulescens* det. Moldenke
rare

34 *Ludwigia*
common

35 (celast.) *Davilla* det. Steyermark, 1980
common around edges of

May 15 - Rio Morichal Largo,
25 km. n.w. Temblador, s.e. of
Maturín

36 *Ficus*
common in gallery forest
on white sand covered by peat.

May 15 - between Rio Tigre
and Rio Guanipa, about
50 km. s.e. Maturín
in small patch of woods
in savanna.

37 *Buchenavia*
in edge of

38 *Cordia* verbenacea DC.
at edge of

39 (celast.) *Davilla* det. Steyermark 1980
at edge of

40 *Vismia*
at edge of

41 *Vitex capitata* vahl det. Moldenke
common in

Monagas

45

flowers yellow

— suffrutescent herb 1-2 m. tall;
petals yellow.

— woody twiner, climbing
on bushes; fruit yellow, and white

tree 15 m. tall, with clean
trunk and spreading
roots at base, bark
milky when cut; fruit green.

tree 15-20 m. tall; fruit green.

shrub 1 m. tall; corolla white.

— twining vine, fruit orange-
yellow; and white.

— small tree; sterile.

— small tree, flowers violet
"flor azul"

46

1964 Venezuela

45242 *Simaruba glauca*
2 occasionalsame - savanna just
outside a patch of forest.
4 43 *Curatella americana* Mr. Steyermark 1980
common2 44 *Ochroma grossourdyi* Mr. Steyermark 1980
occasional at edge of
patch of forest2 45 *Psidium*
occasional at edge of patch
of forest1 46 *Anacardium occidentale* L.
abundant in savanna
around patch of forest,
forming a narrow belt
at outside of forest.4 47 *Brysonima crassifolia* (L.) HBK
common in2 48 *Psidium guineense* Sw.
common in1 49 *Cnidoscolus urens* Arth.
occasional1 50 *Eragrostis*
abundant between
bunch grass4 51 *Psidium*
occasional at edge of
patch of forest in savanna2 52 ⁵³ (apx.) rare in patch of forest in savanna

Monagas

47

tree; fruits blue-black,
fleshy, not very tasty.sprouts from root crown
that reaches surface of
ground- slender shrub 3 m. tall,
receptacle pink, seeds
green, flowers yellow.- shrub 3 m. tall,
flowers white; fruit immature.shrub 2 m. tall, flowers
reddish; fruit immature
(receptacle acid-sweet
when mature and enlarged)shrub 1.5 m. tall,
flowers yellow, fruit green.

- shrub 1 m. tall; fls white.

erect, lactiferous herb
to 1 m. tall, flowers white;
stings viciously.
all seen dead, certainly
an annual.shrub $\frac{2}{3}$ m. tall,
flowers white.lactiferous tree; flowers
white.

48

1944 Venezuela

45253 (anacard.) *Connarus* det. Steyermark, 1980
4 occasional
54 *Coccoloba*
occasional

May 16 - ^{about 35 km} ~~west of Matobos~~ ^{Puerto de Mata}
on highway, near km 57 Toma, Monagas
in open to closed scrub
forest, mainly of *Curatella*

3 55 *Casearia silvestris* Swartz
abundant in opening.

1 56 *Psidium guineense* Sw.
common

2 57 *Croton*
abundant in undergrowth

1 58 *Cochlospermum*
rare

58a ⁵⁷ *Panicum*?
^{in open stream course}
May 16 - 2 km. e. of La Ceiba,
det. Anzoátegui

1 in woods on escarpment
3 59 *Strychnos*? *gendarri* det. Steyermark ¹⁹⁸⁰
May 16 - La Ceiba, Anzoátegui
in undergrowth in thorn forest⁺

1 60 (sterile)
occasional

2 61 *Croton*
abundant

Monagas - Anzoátegui

49

tree, fruit green.

tree, stem.

shrub 1 m. tall,
stem coriaceous, charred,
flowers white.shrub 1.5 m. tall, flowers
white.

shrub 1 m. tall.

small tree.

prostrate, bluish,
eaten by cattle.

tree, trunk spiny.

shrub 1.5 m. tall, flowers
bright purple.shrub 1.5 m. tall, spikes
pendent.

1964 Venezuela

May 16 - Between La Ceiba
and Santa Rosa,in xerophytic scrub on
gravel flat

45262

rare

2 63

occasional

1 64

Erythrina? *Erythroxylon steyermarkii* Plowman
det. Plowman 1982

common

3 65

Lippia? *Cordia steyermarkii* Agostini
occasional

ined.

May 16 - $\frac{1}{2}$ km. of El Tigrein bunch-grass savanna
on fine silty sand.

3 66

Passiflora foetida L.

common

1 67

Galactea? *jussieuana* H.B.K.

occasional

1 68

Galactea? *x Clitoria guanensis* (Aubl.) Benth.

occasional

2 69

Cassia flexuosa L.

occasional

1 70

Bulbostylis

above common

1 71

Stylosanthes guanensis (Aubl.) Sw.rare *Ericosma crinitum* (Kenth.) G. Don

1 72

Stylosanthes guanensis (Aubl.) Sw.

rare

shrub 1.2 m. tall, buds
yellow.shrub 1.5 m. tall, buds
yellow.shrub 1.5 m. tall,
aromatic.prostrate, stems
radiating from center,
fruit orange when ripe,
edible but not inspiring.glaucon, deep rooted herb, flowers
purple.

glaucon herb, very erect.

dry

erect, flowers yellow,
turning red.

erect

same - on hard compact yellowish gray silt, with abundant "buckshot" concretions

45273 *Rhynchospora*
common

3 74 ?

rare, on bare soil
1 75 *Palicourea rigida*
rare

2 76 *Brysonima crassifolia*
common locally

(L.) HBK

caespitose, dry
erect

sprouts from burned
off root crown; thyme
and corollas yellow, fruit green.
— leaves very stiff
shrub 1.5 m. tall,
fruit green.

May 17 - about ^{20 km} west of El Tigre
1 77 *Linum*
rare on hard cracked clay & silt
with sparse grass

flowers yellow.

May 17 - ^{s.e. of Cachiboo, headwaters}
~~about~~ of Rio Guáre, west of El Tigre
is on edge of ravine
cut in savanna covered plain

1 78 *Ochroma*
occasional

rigid shrub 1 m. tall,
receptacle red, seeds green.

1 79 *Copaifera*
occasional

trees, pods reddish orange.

2 80 *Randia* ?
occasional on bare soil

San Tomé -
May 17 - bus trip, El Tigre -
Valle de la Pasión & Calabozo
Left at 7:30

Principal street trees are
Brazos, Curatella of sticta.
Pelonia. Mangos are ripe.

(Man from Mene Grande
Co. says all savannas are
burned at least once a year,
some two or three times.)
E. of San Tomé Curatella savanna
then a monchado along a
river.

~~El Tigre~~ for Tomé

West of this extensive
Curatella - bound. grass
savanna, but with a
coarse reddish sand
layer between the bunches
of grass.

In market - El Tigre
onions, yuca, potatoes,
cabbage, bell pepper, cucumbers,
carrot, beets, sweet potato,
an assortment of squashes
(c. max), tomatos, eggplant,
garlic, rice, several colors of
beans, black, pale green, brown, white
diti, melicocca, lime, maize,
plantains?, ginger, papaya,
peanuts, coffee, ~~coffee~~, dry
maize, bananas, mangoes,
yam, shondas, cassava, bixa
cauliflower, turnip, okra

Talisia
m. shrubs
chico
bocelli
dividio
guava
cavendish
string beans
grapefruit
garlic
avocado
guavaberry
peas
Tamarind
Vitis cedrosensis
P. longistylus
P. vulpina
curcurbita
choco
anacardium
mucuna
Palma
P. tefifolia

tomate
pimenta
chile dulce

A medium size pear shaped
tomato, as well as ordinary one.
chile is a small ~~yellow~~ ^{yellow} about 2-3 x 1-2 cm.

celery, parsley, orange
string beans, avocados, yuca

Large tortillas of manioc called
casave. up to 1m across 5-8 mm thick

Interesting that there are
very few mangos for sale - perhaps
reflects that there are so many
produced locally and available
for the taking.

morecure - Curatella ^{small like} ~~subodella~~
elaeocarpus ^{small like} ~~subodella~~

Photos of some of ^{elaeocarpus} ~~scrubbed~~
products.

West from El Tigre -

Curatella savanna on a
red sandy soil - the red
sand reaching a considerable
thickness 1 m +? judging by
an exposure in a pit.

~~The~~ The pit shows the a reddish
silty material, blocky, up to 1m.
several low small hills,
covered by concretions.

seen to be old erosion remnant
rather than dunes, even
though shape is that of
dunes. Some may well
be dunes, others have laterite
outcropping.

7 acres very sparse to
almost lacking.

P

Stop some miles. N. of
C. T. 1000 in a low silty area
of Curatella savanna - the
Curatella rather irregularly
distributed. Scattered & w. well.
Scattered low rounded
forest remnants. Linum.

Somewhat west of this the
road skirts the head of
a great ravine with
red to marl cliffs, mostly
scrubbed, but some gentle
slopes grassy.
Photos, Kod., start b. w. well.
Quite an assortment of tree
and shrub.

West of this the savanna
thickens up to form an
open ^{scrub} forest, ranging even to
closed scrub forest and in
the other direction to savanna. The
grass is more abundant in the
more open end of the continuum,
scanty in the closed part, where
there tend to be shrubs.

Terrain becomes more rolling,
more gullied.

Pariaquean
aspect becomes suddenly
drier, relief more sharp.
Then greener again.
Locally more or less typical

Curatella savanna, more
predominantly open forest.
Then, suddenly, deciduous
scrub forest, then green
again with patches of
savanna. Generally
varied between road savanna
and open forest. Grass
rather general.

Stop in savanna of
Curatella, Bowditchia,
Byssinaria crassifolia, B. cordobensis
Rourea complicata, Psidium
guineense, Caesaria silvatica,
and band grass that is
up to 1 m. tall Hypanthium
mfa. The trees here are
up to 10 m. tall, perhaps
10-20 m. apart or more.

Laterite crust exposed
in ravine (sample) shows
striking accretionary rings.
These may very well be
result of alternate wetting
and drying. Form around
nuclei of finely mottled
gray and brown clay.

Farther west the country
becomes still more
dissected and vegetation
becomes more and more
a deciduous scrub forest.

but with one, green trees. Patches have recently been felled and burned. The area is open enough to be savanna, but tends to have a more or less continuous, deciduous, shrub layer.

Then a fine *Copernicia* savanna with grass and locally some other trees. Where there are more other trees grass is denser. Patches of this palm savanna are fairly abundant. Interspersed is open deciduous scrub or forest, locally, tangled deciduous thicket. Then *microphyllum* thorn forest and thorn savanna. *Copernicia* savanna with abundant grass up to 1 m. tall. The palms in any one place are fairly uniform in height, but from place to place range from 3 to 6 m. Some *Acrocomia*, but more in other way than with *Copernicia*.

Much recent burning through all this country.

Many flat topped or umbrella crowned trees, but not very tall.

Then more typical *Curatella* savanna but with fairly large trees. This gradually closer to open scrub forest and even locally closed scrub forest.

Ravines have gallery forest.

Much more *Copernicia* savanna.

Then deciduous or semi-deciduous open forest and thickets. Palms (*Copernicia*) scattered irregularly in this. Then in "palm savanna" the *Copernicia* seem to be much more even in height than when in other vegetation.

Forest tends to be more deciduous and bare.

Then extensive open *Copernicia* & grass savanna. One area seen where all palms were under 1 m. tall.

P 1 of Taguapiré
exit of Santa Maria
de Uire for photos of
extensive *Copernicia* savanna
on gently rolling land,
very extensive, not
much but grass under
the palms.

Then good deciduous forest. 15 m. tall, open to closed, patches of thorn forest or scrub. Patches greener than

others.

Tagerapine - Deciduous
forest, more or less thorny.
Copernicia seeds. The
Copernicia shows various
narrowings on the trunk.
See Vareo & other papers.

the Mania d. flâne.

A good bit of cleared land, burned over, is regular deciduous scrub. Between this locally thin out to form savanna, which then becomes locally savanna, locally dense to form thicket.

They get green again
and green ~~and~~ and when they
are not become mixed ~~and~~ forest

at the many sides and
no ~~and~~ ~~as~~ in the ~~the~~ ~~the~~
number of small ~~as~~

equated to ~~the~~ ^{the} developing
forest. gradual change is in
very "patchy" savanna, with

get farther apart - grass between, then closer together until

a ~~thin~~ a layer is formed. Then
~~the~~ by becoming more
and more continuous until there
is a continuous, locally open,
~~the~~ ~~continuous~~ scrub.

Flatens increase, till it
is good cleared out past.
Then there is a large
area of grassland on it side
then a mosaic of
savanna or thin savanna
and deciduous forest, then
a mostly savanna
landscape, on rather
rolling ground, then
more thin scrub, closed.
Valle de la Pasana.

some cultivation. Then mosaic of deciduous forest and cleared land that answers character of savanna. It now still remains on some of it. This seems to be a broad strip on both sides of road, and extends a good distance. *Mesopbyllion* then scrub may come in when deciduous forest is destroyed.

The deciduous forest varies from open to closed, is about 10-15 m. tall, has a shrub layer some m. tall, also deciduous.

Then fairly extensive
desert ~~scrub~~ scrub. Has been
burned recently in many
places. Scattered *Copernicia*
in it. Considerable clearing and

burning. Some trees scattered in scrub areas.

Then grass with a few scattered trees in flat low ground, deciduous forest on hills a escarpment, at Picospica. This is south of road. Then scrub north of it. Doubtless an old clearing.

Then thorn scrub on both sides. A picturesque semi-crescent leaves appear locally. Then areas of *Copernicia* savanna surrounded by thorn scrub and thicket.

Some low hills and mostly cleared and burned land.

Then rather x all most grassy clearings. First open thorn scrub and closed deciduous forest.

Chaquea rama.

Mosaic of deciduous forest and clearings.

Then semi-open thorn scrub with scattered large, mostly deciduous trees.

Then locally more abundant. By totally large clearings. Some of these invaded extensively by *Calotropis*.

More clearing than forest.

Then a large fire on left side. Probably severe enough that few smaller plants could survive, but ~~few~~ the scattered trees probably not damaged.

On other side a bunch-grass pasture of *Panicum maximum*, with some palms, a few other trees. Along the road are ~~several~~ clearings, mostly recently burned, but beyond a ~~couple~~ a couple of hundred m. deciduous scrub, or forest. In places reaching road. More and more along road. Generally the scrub is 2-3 m tall, closed, with scattered trees. The cleared strip along the road is a frequent feature. Burned clearings with stumps are common. Patches of good forest with flat topped trees about 10 m. are common. The other phases appear to be degraded from this, or in succession back to it from clearing, if not actually cultivated or managed as pasture.

Then some low rolling hills, mostly cleared but with patches of deciduous forest. The cleared part in grass with scattered trees.

Much burned land.

Then flat grassland with scattered flat topped trees on one side of road, tall scrub with similar scattered trees on other - all deciduous. Cattle grazing in the grassland. Several ponds.

Then, on other side, much burned land. On south side guinea grass pasture.

Broad burned strip on each side.

Patches of taller forest, tending to be evergreen - really gallery forest along ravines. But some fairly tall deciduous forest in small patches.

Much tall thorn scrub scattered trees and patches of forest, burned areas and clearings. The thorn forest begins to show a tinge of green.

Large areas of mixed thorn scrub and deciduous

forest.

From small rise at upper that the deciduous forest characterized by a very gray brown color, extends a long way in all directions.

This varies in density, and proportion of trees to shrubs - shrubs form a 3-4 m. story, generally closed. The trees may be 10-12 m. tall. Some *Copernicia* scattered in it. We seem to be gradually climbing, but this may be an illusion.

On top of a long rise this tends to thin out and become more open, though otherwise not changing much. Thickens up again, with a few more green trees in it. Palms are fairly common.

Locally the forest looks about half evergreen. Many rather open areas.

On the east side of a low range of hills the evergreen elements seemed to increase in proportion, but from top. The forest as far as we could see is bare.

In a good distance the

vegetation is rather a savanna and thicket.

Then on right a vast cleared and burned area with scattered trees mostly *Capparis* (?) and *Copernicia*, with grass in unburned portions.

Then some forest again, but entire aspect - forest, trees in savanna, etc. has become green. Gallery forest along Rio Guárico at El Foradero.

Turned south here.

Cleared land and semi-deciduous thickets. scattered tall evergreen trees in cleared top land. This is essentially bottom-land.

Copernicia very common locally. The scrub & thicket as well as trees here are green.

As we come up out of bottom land, there is extensive cleared land - grassy with scattered trees. The trees are mostly umbrella shape, medium height. On dissected but rounded escarpment there are almost continuous thickets, all open.

Then on top of this a semi-

deciduous ~~woodland~~^{open to closed} thicket forest. Then a savanna that approaches open forest, this semi-deciduous La Encrucijada.

Savanna with abundant trees. Then rounded gravel hills with semi-deciduous scrub, then areas of open scrub & savanna. Thorny. I cattled flat topped trees in scrub. *Copernicia* common.

Shrub savanna to open scrub. The commonest shrub in all this appears to be a microphyllous *Acacia*.

Now a larger leafed green open scrub alternating with savanna. Now *Brysonia* and some *Castella*, also *Bowditchia*. Savanna and patches of "mats".

Savanna with trees to 8 m. tall or more; thick grass where not recently burned.

This merges into an open or even closed and tangled scrub forest.

Then open savanna with scattered large shrubs and small tree, irregularly distributed.

Then some cultivation,
then more open savanna.
Ravines and dissected land
are forested.

Then open scrub; then
savanna.

We seem to be following
a flat topped wooded ridge
between two dissected, wooded
areas. On top the flora
varies from scrub to
savanna, to palm savanna,
to grassland. Palms mostly
very short.

Broadens out into an
extensive open savanna.
Cerratello - Bystropogon of all
sizes. Tree and shrub
become very scarce except
Copernicia which becomes
very common.

Then small patches of
scrub. Then large area of
grass with small Bystropogon.
Patches of the sugar cane.

Wood, plant become very
scarce esp. local areas of
palm. On right a more
wooded area slopes down to the
reservoir. On left irregular
rather clumped trees and
shrubs in grass.

Rather irregular savanna
continues for some distance

much laterite locally
on surface.

Flapped - the laterite
is largely a semi-irregular
mass, but has quartz,
sandstone, and other pebbles
concreted in it. The exposed
part is badly weathered.
surface is black.

Bryum muscoides very
common here.

May 17 - west of Paraguana.
Est. Guárico
in savanna of *Hypanthelia*
and several species of trees
on flat hard ground

45281 *Roupala intricata*
3 common

2 82 *Roupala intricata*
common

1 83 *Bowditchia*
common

3 84 *Brysonima coccolobaefolia*
common

1 85 *Hypanthelia rufa*
dominant in grassy areas

May 17 east of Taguapire,
east of Santa María de Uspire
roadside in savanna

2 86 *Helicteres*
common

May 17 just west of Chaguaramas
Est. Guárico

in weedy roadside in dry forest area

1 87 (malv.) *Herissantia crispa* (L.) Briz. det
rare

2 88 *Tephrosia cinerea* L.
common

tree 5 m. tall, leaves stiff,
young sprouts from stump,
sterile.
small tree; sterile.
small tree, petals pinkish
small tufts, culms
arching, to 1 m. tall.

shrub ~~1~~ 1.5 m. tall,
corollas scarlet, tubular.

Fryxell
1977

herb 1 m. tall, much branched,
flowers pale pink.
flowers purple.

May 17 n.e. of Calabozo
in savanna

45289 (anom.)
1 in bit of wood
3 90 *Rynsonia verbascifolia* (L.) Rich. common locally

May 18 - Proyecto Guárico,
s.e. of Calabozo
weeds around farm yards

1 91 *Paspalum*
2 92 *Amaranthus dubius* Mart.
sids?
1 93 abundant
1 93a *Ludwigia* ^{Acchygnemone} *euema* C. Wright. petals yellow
small.
1 94 *Portulaca oleracea* L.
common
1 95 *Spermatoceae verticillata*
common
1 96 *Euphorbia*
abundant
1 97 Turners
1 98 *Heliotropium* cf. *ovalifolium*
occasional
same in rice field, shaded by rice
1 99 *Ludwigia*
45300 *Echinochloa colonum* (L.) Link
abundant
2 01 *Leptosiphon*

sprouts from woody
root crowns; flower yellow.

- culms erect.
- erect, spike somewhat nodding.
- sprawling sparsely
branched herb, flowers
white to pale pink.
- spreading fleshy herb,
flowers open at 10 a.m. petal
yellow, notched stamens few.
flowers white.
Plants erect or ascending.
flowers yellow; stems
many from root crowns.
fls. white.

- petals pink-purple.
very strictly erect.

- flowers yellow.
panicle purplish.

May 18 - bus trip Calabozo south to San Fernando de Apure
 Canatella - Brysonia
 savanna just out of town, then gallery forest where we crossed a river.
 Rice fields ~~were~~ over a very large area. Trees around dwellings and scattered elsewhere locally.
 Large irrigation canal; with marshy spots and ponds along road with Typha, etc.

One fork of canal follows road, the other two at right angles. Rice seems in all stages, from fallow to headed out ^{100-150 days to maturity} planting from mid-December to May.

Weeds: ^{Planting from mid-December to May}
Heliotropium indicum
Cleome spinosa
Ipomoea dulcis

Reason for only 1 crop a year is that between crops they put cattle on the land to control the weeds.

Borreria verticillata
Lida sp. (white & pinkish fl.)

Euphorbia sp. *glomerifera*
Portulaca ~~gossypina~~

Lida acuta

Passalora latifrons

Salpiglossis *scabridissima*
Heliotropium *gracilifolium*

Cynodon dactylon
Alternanthera procumbens
Malachra sp. *albifolia*
Geschnosia
Turnera sp.
Cyperus sp.
Paspalum
Oenanthas

These all in barnyard

P.

In rice fields proper ^{A.W.} photo.
Echinochlos sp. *colonum*
 is principal weed.

There are many weeds along margins and in ditches

Cassia tora (long pod)

Eclipta

Euphorbia sp. *glom.*

Cyperus sp.

Sudovia (soft)

Hyparrhenia sp.

Scoparia

Rice is harvested while straw is still green. The machine cuts the straw and it is left in the field. Cattle are turned in after harvest.

Poles from *Cyperus* are used abundantly in construction.

17 000 hectares in rice ^{quarico project}
 project much more.

On south ~ some large trees round crown, low branches scattered in fields. Delonix in full bloom. Large trees more abundant southward, grasses also. Cultivation less intense. Other crops than rice locally. Much more fallow rice land to south. Much newly plowed land.

Then canal turned left. Beyond this rice on left, cleared land on right other crops for a short distance. Then pasture, thicket and palm savanna.

Stopped just south of limit of cultivation in an irregularly thickly vegetated tree to 15 m. in an open forest arrangement but with thickets tangled with scrambles and with grassy openings. *Copernicia* common, often with strangling figs. Soil fine, dense, cracked blocks.

Guazuma common.
Gesalpinia cf. *coquimbensis*
Randia sp.
Dioscorea (ann.)
Tamarindus

P
B & W
wood

Anolis
Pterocarpus

Immediately south is Byreoniwa savanna very open, small bushes only, short grass. rolling terrain. occasional thickets.

Then some cleared land. Open forest of Byreoniwa adjacent.

More clearing.

Some open grassland, some savanna of palm and deciduous shrubs or small trees, some tangled open to closed scrub. Mostly irregular savanna.

Then more irregular thickets and openings.

Many cattle ~~crocodiles~~ ^{crocodiles} small farms.

All along this road are ponds ~~and~~ accompanying borrow pits. Many small crocodiles.

Scattered small patches of palm savanna. Then fairly general palm savanna with thickets locally.

Open desiccated low ground with thin grass & scattered trees, some palms

Thickety savanna, local patches of closed tangled scrub forest, prob. deciduous.

Large open areas of very short grass, with patches of scrub, scattered palms locally, what appears to be gallery forest to left at varying distance

Then savanna of
palms and ~~the~~
microphyllous shrubs.

Become taller and thicker.
Palms locally very abundant. Patches of tangled scrub forest.

Decedents, the Palms

very abundant.
Irregular spatchly savanna
fairly large trees.

Very large
Big ^{the} areas open - large
areas of grass with few
brushes - forest (?) in distance.
Some patches of trees, but
very large areas without
any. Very short grass.

Then patches of palm.

Continuous palm savanna,
rather wet grassy, locally
with, locally without
other trees.

several new photos.
A bit further north.

a stop on border bet. palm savanna and esters. (submerged areas during ~~dry~~ wet season) no woody veg.

The extero soil is deeply
cracked, mostly bare
but with ~~rank~~ very open
mat of ~~grass~~ ^{grass and} 2-3 cm
or three other very prostrate
species (*Vineetoxylon*? ~~Heleo~~?)
and with widely spaced
Heleostrisium indicum
giving the character to
the landscape. Slight
irregularities in ground

No essential difference
in edge of palm grass
except surface more
irregular.

Several seedling palms in cracks.
On other side of road
palm are about evenly
distributed from no taller
to 7 m. tall, spaced
from 3 to 3 m. apart.

A few open lands and
many mostly dry, herby,
covering a good part of
the ground. Ground very
rough with cattle tracks.

South the Artemesia is on
both sides, but as Camaguey
~~San Fernando~~ is approached
the landscape becomes
shrubby and with
scattered trees & cult.

Then more low lying land but with scattered trees, grassy some grassy and without trees. This more disturbed, many small farms. Many shallow ponds.

Then an extensive green grassy landscape mostly open but a few trees and with what appears to be the gallery forest in distance. The grass appears to be a coarse thing like *Panicum maximum* but eaten down to tufts, 1-3 dm. Many ponds locally.

Then thickets and palm groves appear, esp. near road. Great flock of egrets and scarlet ibis in a pond along road.

One pond covered by *Salvinia*.

Then closer scrub forest with abundant *Cyperus*. Then open green grass. Pond with *Crotonimia* in flower. Gallery forest in distance to rt.

Another pond with

hundreds of egrets, some ibis, many anhinga

Patches of palms & of thickets. Open grass with trees.

Rio Apurí

Large areas of apparently cleared bottom land with large trees, grassy areas, cult. field, etc.

Chedrelia planted as an ornamental at club.

Dense low tangled forest along a dry channel.

Road from San Fernando to San Juan de Ayara.

Cult. field. Commonest plant is *Pomoea caerulea*.

Prosopis, *Guazuma*, *Licaria*, many broad-leaf trees.

Land is largely cult. except for depressions.

Many large trees, tangled ferns, rows, wooded channel banks, etc. General aspect is wooded. "bananeras."

Many thickets. These become more dominant. Large *Tournefortia* abundant.

Patches of dense closed

forest called "calcelas".
Most abundant plant
in fields is *C. crassicaulis*
called "eligonias".

The thickets I took to be
mono-phylloous, a cashioce
Baccharis. Much open ground.
The ground here is deeply
cracked.

"Calcelas" - very tangled
closed forest with an
abundance of ~~leaves~~ lianas.

Entire area inundates
in wet season. Roads on
levees.

Inside of calcelas not
impenetrable, but edge
seen so. Locally very
dense and difficult.
Seems to be just dense
secondary thicket following
abandonment after cultivation.

Cyathia *Licania*
Crocoloba

~~Pithecellobium~~

Just outside is a well
with water about ~~about~~
3-4 m down, in fine grained
soil. Cleared fields.
Pervolia used as living fence.

At edge of forest is an
area of loose & tall
slender shrubs. Ground
cracked. *Eupatorium odoratum*
common.

Large areas completely
open - low hard cracked
soil, dominated at
this season by *Ipomoea*
crassicaulis - said to
be inundated 1-7 m for yr.
Wooded areas dense and
tangled, crossed by
channels, now mostly dry.
The open ground seems
slightly lower.

North of Rio Apure
are dense palm forests
thinning out to palm
savannas. Then more
palm forests. Stumps
show that large areas
of this have been cut.
A small fenced patch of
forest ~~is~~ is burning fiercely.
Patches of calcelas,
and cult. fields.

North, ~~near~~ ^{water} *Canaguan*
several ponds with literally
hundreds of egrets, a few
scarlet ibises, avocets, etc.
eating small fish trapped
in the ponds.

much burning going on here.

Many of the ponds ~~near~~ have no vegetation around margins. Why?

~~Lake~~ Carranagan.

Turned east on dirt road.
Weedy pasture with scattered orange ~~oak~~ trees on left, thicket on right, then pasture in it also.

May 13 - just s. of Projeto Guárico, s. of Calabozo in open, tangled scrub forest and thicket.

45303 *Andira*
' occasional
1 04 *Randia*
' occasional
3 05 *Randia*
common

05

May 13 - north end of Estero de Camaguán just north of Calmaquán in bare desiccated bed of seasonal lagoon.

1 06 *Trichospira verticillata* (L.) Baker - det. H. E. Robinson, 1974.
rare
2 07 *Heliotropium indicum* L.
abundant, dominant
1 08 *Heliotropium ovalifolium*
rare
1 09 *Mimosa*
abundant, forming a discontinuous mat
1 10 *Mimosa*
occasional
1 11 *Hydrolea*
rare

small tree, ripe fruit red.

sterile shrub, branches in one plane.

- tangled semi-scandent shrub, branches very stiff, decussate.

prostrate

erect, much branched,
to 0's m. tall, flowers lavender,
fls. white, plant erect

prostrate, sterile, very sensitive.

almost prostrate, very sensitive, sterile,
prostrate.

near la Guama
May 18 - ²⁰ of
San Fernando de Apure, on
road to San Juan de Payara
in ~~the~~ tangled ~~of~~ secondary
forest called "calcetas"

45312 bignon. *Tanaecium crucigerum* Seem.
4 ~~bignon~~ det. A. Gently 1974

3 13 *Pereskia* & guanacaste det. Steyermark 1980
planted in clearing

same - in area of
~~sparse~~ open scrub
at edge of forest
called "calcetas".

1 14 *Copaifera* *connarus* *connarus*
common det. Steyermark 1980

3 14 *Copaifera* *connarus*, det. Steyermark, 1980
common

1 17 (flac.?) *Psidium* det. Steyermark 1980
common

3 18 (flac.) *Hecatomeron guazumae folios* (HBK) Steyermark
common det. Steyermark 1980

4 19 *Pithecellobium* *lanceolatum* (H.B.) Benth.
occasional

3 20 *Pacifilia*
occasional

1 21 *Cordia*
abundant

lians ~~flowers~~ white
falling readily.
buds zig-zagmatic,
pointed.
small fleshy tree,
almost spineless.

— tree
shrub fl. whitish
— fruits pendent, red.
shrub 1.3 m. tall,
fruit orange red.
— shrub 1.5 m. tall,
flowers whitish
shrub ~~is~~ 2.3 m. tall
flowers whitish
vine, flowers white.
shrub 1-1.5 m. tall.

May 19

Estación Biológica de la
Sociedad de Historia Natural
de Venezuela

Herbarium of several hundred
sheets from Calabozo Region
in good covers

Pit in typical savanna
shows a layer of fine
soil a few cm thick,
changing to a thick layer
of irregular laterite pebbles.
A curvilinear feature about
2 cm diam at ground, base
vertical tap root reaching
at least 1 m, tortuously but
pebbles. Branching somewhat
in soil layer.

A large tree has an
extensive superficial
root system, reaching as
much as 15 m from trunk.

The vertical roots are
not too well developed, said
to be because of gravel layer.
but behavior in sand
should be checked.

Burned area has 'lafles'
averaging 1-2 da. apart,
immediately adjacent unburned
grass is closed, continuous,
1-2 da. tall.

Considerable accumulation
of pebbles on surface. Large
blocks of lateritic conglomerate
protruding when surface
slopes a little, some blocks
well buried in surface of
the gravel layer.

Geol. maps give age of
material as Pleistocene but
van der Hammen says prob.
lower Pleistocene or lower.
Much evidence of surface
erosion and deposition.

Little cut or windrows of
dead grass fragments suggest
sheet flow of runoff.

"Mata" occupies depression
in arid surface, filled with
soil. Mixed more savanna
shrub & tree of forest

One very large one mata
is on an ordinary profile, without
the depression. This one includes
Curatella ^{howittiana}, suggesting that
the mata has spread over
an area of savanna when protected

from first. *Periphyllum*
of *Bryosoma*, *Curatella*,
Cochlospermum, *Guettarda*
Cordia, *Lippia*, *Guazuma*,
etc. *Eugenia* or *Muraria*

The grass is 3-7 dm. tall
outside this but it stops
abruptly at the edge of
the mata.

On the savanna nearby
each *Curatella*, *Bryosoma*
tree is an incipient mata
with stumps, ~~and~~
~~seedling~~ of various
species surrounding
it. It has been protected
from fire 3 or 4 years.
Grass is dense, to 3-4 dm.
tall, torped.

Locally the gravel
layer dips down some
m. and is covered by a
mottled clay that is
wet a few feet down
even in the end of the dry
season. This sort of
site marked by *Vochysiella*
poncuelana in the mata.

P. b. r. top land + base of tree
but burned + unburned
savanna.

P

photos of *Curatella*
tree of comparable size in
unburned and burned
savanna

In burned
Bryosoma
Cordia
Eugenia
Cordia
Other

and others sprouting but
not identifiable

Unburned
Eugenia
Bryosoma
Cordia
Casuarina
Guettarda
Muraria
Annona
Smilax
Unident. legum
Broaditchia
Cochlospermum
Cassia

May 19 - Trip by bus Calabozo to Maracay
 North of Calabozo - Curatella, *Bryconemum* - *Bowditchia* savanna.
 Then along the dam area
 Rio Guanito - below dam
 is thorn forest ^{some} in valley
 bottom. Above is a great
 reservoir, in which are large
 areas of still standing dead
 trees. Below dam several
 ponds surrounded by *Typha*
 marsh. Reservoir is
 down about 4 m. from
 high water. The ponds
 below dam are borrow
 pits from which the
 material for the dam was
 taken. Some of this area
 is savanna, some with
Copernicia + *Acacia* or *Prosopis*.
 Some Curatella - *Bryconemum*
 savanna almost closed
 either with rather closely
 spaced small trees.

Beyond w. end of dam
 is thick Curatella, perhaps
 open scrub rather than savanna.

Then open forest to savanna
 of *Bowditchia*, *Curatella*, ^{*Bryconemum*} etc.

Then in short grass?

Land surface of well developed
 trees, to 5 m. tall or more,
 vines from savanna to

open, locally closed, forest -
 then open *Bryconemum* - *Curatella*
 savanna. Grass grazed very
 short. Trees to 5-6 m. tall.
 Uniform over a long distance,
 locally thicker, often
 thickets tangled with vines.
 After some distance closed
 forest becomes general except
 where cleared. Some regrowth
 from clearings. Then this
 forest becomes lower and
 more microphyllous.

Hato El Coto.

Then taller again. Closed, and
 tangled with vines.

Low thorn scrub. Then
 grass with scattered *Copernicia*.
 Locally the palms are absent.
 Locally spots of scrub.

Then become gently
 rolling and thorn scrub
 is the vegetation, open to closed.

Then mixture of thorn
 scrub and grass, with or
 without *Copernicia*. Large
 area recently burned. The
Copernicia leaves killed but
 new ones appearing.

Mixture of deciduous thorn
 scrub and *Copernicia*. *Copernicia*
~~and~~ in places
 est where are tall trees.

Trees become larger, except

when burned.

Then a great extent of open to closed, irregular scrub, much of it recently burned. Some areas of it with *Copernicia*.

All of this scrub and most of forest seems to be deciduous but well on toward being leafed out.

Then rather well developed closed microphyll forest, lower, more irregular in places, locally openings with *Copernicia*.

Then thorn shrub savanna, then open forest with tall dry scrub. Trees get taller, to 10-12 m.

Going down a very long gentle slope and the forest gets more general, more microphylls, then lower.

Bough over land on other side generally bounded with deciduous microphyll trees. This runs up to some low rocky ridges with open forest.

On other side a rather broad valley with micro-

phyllous forest.

See photos of this forest on ridge and in valley, must be ~~north~~ ^{near} Maracaya.

Ridge on other side has savanna or forest on steep slopes. Much rock showing.

Open forest on basal slope.

Another valley well irregular forest - scrub forest. Palms locally. Los Carrizos.

Deciduous forest and scrub forest rather microphyll. Hilly country, not covered by rather irregular microphyllous deciduous forest.

All of this forest, from Calabozo, has been green, but undoubtedly deciduous.

Now it is less green, locally bare.

Locally it is open and grassy.

Stony.

Valley with some flat areas which are cultivated. Otherwise with deciduous forest & scrub, locally thorn scrub.

Becomes more and more bare ^{of leaves} as terrain becomes more

hilly. Some hills bare
and grassy or partly
so.

Parapana - hills are
mostly grassy and brown,
with or without scattered
trees.

Broad flat valley has
open deciduous scrub
or small forest.

Hills now covered by open decid.
forest; closed in valley
and ravines. Stream
in valley dry.

Hills vary from open forest
to savanna dense in ravines.
Then hill to left is low
typical *Curatella* savanna,
varying to grass without trees.
- valley scrub forest, partly
cleared for cultivation.

El Manguito

Climbing along a ravine,
wooded in bottom, savanna
on both slopes.

Becomes more bushy toward
top.

Finds La Enceta
for 2 hrs.

Upper slopes degraded
and bushy, eroded.

Wooded in ravines.
Brush on these slopes is

tangled with a great
mass of tall
herbaceous vines
now completely dry.

San Juan de los Manos.
From here to ~~El Cura~~
same road as described
on pp.

Stupendous limestone
pinnacles and crags.

Tangled scrub and
cultivation.

Limestone hills thickly
eroded on upper slopes,
shifting cult. on lower.
Flat land in valley cult.
except narrow gallery on
river banks. A little
water in river.

Not sure that these
peaks are limestone -
have the appearance also
of remnants of a great
igneous dike - very straight
sides, arranged in a row.

Hills now savanna
covered, in bare, flat valley
bare, ravines eroded.

Villa del Cura.

Rd to San Francisco de Asis,
a conga'd rd. thru cultivation -
maize, cass, etc.

No, this merely led back to highway to

4.7 de Asis. Follows valley
bet. hills covered with
cunated grass savanna.

San Francisco de Asis.

Hills to left are grassy
with strings of woods in
ravine, anastomosing below in wooded
gullies.

Came out onto plain,
mostly cane plantation.

Lower slopes deciduous forest.

Field separated from
road by hedgerows of small
tree. Some fields are
fallow, also lined by tree.

Puerto Negro.

Large trees line road to Manacap.

Large vineyard on left,
probably of Passiflora, strung
up on wires.

Small ravine beyond?

Palo Negro.

Follows fields with scattered
large farm areas.

Carretero

Santa Rita

Extensive fallow fields.

Some fallow.

El Guareto

Broad dome shaped
farm areas are the outstanding
feature of the landscape.

May 19 - Estacion Biologica, Res. evo.
near Calabozo.

small island of forest
in ~~canal~~ savanna.

45322 2 Guettarda elliptica Sw.
one of commonest plants in

2 23 Randia
occasional in

2 24 Guettarda elliptica Sw.
one of commonest plants in

2 25 Cassia Erythroxylon det. Steyermark, 1980
occasional in edge of

2 26 Cordia chacoensis Chodat
occasional just outside of

1 27 (rub.) Hippia sp. det. Kirkbride, 1977
under Beratella, tree in
savanna

same - in small clump of
trees on deep compact
mottled soil in savanna

3 28 Smilax

2 29 Vochysioides venezuelanae Steffen
said to be indicative of
this soil type

3 30 Xylopia aromaticia (Lam.) Mart.
occasional

same - in small clumps of scrub in
savanna

2 31 Eugenia
very common in clumps
of scrub or forest in
savanna

1 32 Annona chirimoloides
occasional

shrub 3 m. tall.

shrub 2 m. tall.

shrub 2 m. tall,
fruit dry.

shrub 1.5 m. tall; fruit immature.

shrub 1 m. tall; flowers white.

sterile small plant.

vine climbing in bushes

sterile tree 8 m. tall,
leaves glossy above,
yellow green.

slender shrub, sparsely
branched 4 m. tall; flowers
white, fading yellowish.

shrub, aromatic when
broken.

shrub 1 m. tall.

104 1964 Venezuela

45333 *Lida*
' occasional
' 34 *Casearia*
occasional

' 35 May 19 - San Juan de los Moros Est. Guárico
Lippia

May 19 - near Palo negro,
Faja de Valencia, Est. aragua
roadsides

' 36 *Heliotropium parviflorum*

3 37 *Boerhaavia diffusa* L.
common on

May 19 - Estacion Biologica
Reserve, ^{near} Calabozos, Est. Guárico
Casearia
in clump of scrub in
savanna

105

- suffrutescent herb 1 m. tall.
- strongly aromatic.
shrub, m. tall, fruit
immature.

flowers pale pinkish with
yellow centers.

much branched
suffrutescent herb.
flowers white.
stems prostrate,
forming a loose mat,
inflorescence ascending.

shrub 1.5 m. tall, fruits green,
turning black.

May 22 - in the Canoa -
New York

South coast of Puerto Rico $\frac{3}{4}$ mi. S. of Ponce.

A lagoon surrounded by a forest of islet. on shore a mangrove swamp with tidal channels leading from this a patchwork of cultivated fields.

Inland from this and extending across the island an intricate pattern of hills, mostly cleared, but having perhaps 15-20% of wood remaining.

On the hills a belt of coastal forest with sugar cane but with patches of mogotes in it.

May 27 - Great Falls,
Potomac River
in rocky area at edge
of second-growth woods

45339 3 Tipa
very local

2 40 Senecio
local

1 41 *Krigia virginica*
very local in rock crevices

1 42 *Euonymus americana*
occasional

2 43 same - in wood
Ilex
rare

5 44 *Ptelea trifoliata*
common

1 45 *Euphorbia*
common

1 46 *Tradescantia virginiana*
occasional in shade

ca spiky spikelet
- deep purple
flowers deep yellow

shrub to 2 m. tall,
flowers slightly binged
light green.

shrub 2.5 m. tall,
flowers white
shrub, flowers pale
green, ill-scented.

roots fleshy, yellow;
flowers curved downward.

May 3 - Alexander Keyser
Memorial Foundation
Plant list

Top of a sand hill
Lindernia benzoina
Lesq. organa
Mitchella repens
Pilea ciliolata
Sonchus gallicus
Stellaria media
Liquamenus virginicus
Galium triflorum
Chrysanthemum
Lomelia rotunda
Podophyllum peltatum
Woolly bellflower
Arenaria hispida
Lonicera canadensis
Athyrium filix-femina
Carpinus caroliniana
Acer rubrum
Amelanchier alnifolia
Sassafras canadense
Rubus hispida
Lychnophyllum peltatum
Cirsium heterophyllum
Platanus occidentalis
Ranunculus
Deltiodia canescens
Polystichum acrostichoides
Grevillea petiolaris
Parthenocissus quinquefolia
Robinia pseudoacacia

Pleiotrichia triandra
Kalmia latifolia
Gaultheria ~~americana~~ tomentosa
Dodecatheon
Taurionopis
Carex
Fragaria virginiana
Cicer arietinum
Ulmus americana
Corylus americana
Flex ventricosa
Ostrya
Asimina triloba
Lilium
Gaultheria shallon
Cassia obtusifolia
Vitis labrusca
Peltandra virginica
Cornus amomum
Cochlearia
Polystichum acrostichoides
Asplenium platyneuron
Lunaria rediviva
Betula nigra
Krigia virginica
Stellaria media

hooded warbler
redstart
pileated woodpecker
~~Bluebird~~

warbler
box turtles

shrub layer on
steep north facing
wall of ravine covered
with Rhododendron
& Maxima, some Kalmia
practically nothing on ground.

Flat bottom of ravine
dominated, in shrub
layer, by fir trees,
small *Carpinus*, *Salix*,
On ground *Lumpocarpus*,
Cirsia, *Podophyllum*,
Rhus too. *Athyrium*,
Arisaema, *Peltandra*,
Impatiens, *Uilea*, *Wenstaedtia*.

Lower down the ground layer
becomes more open.

Streams of brown water
on clean bed of fine of sand.

Up is a large dried
beaver impoundment.
a bit lower down is an
opening with several
very large fallen trees mixed
below them a thicket of small
Betula nigra,
then a large beaver dam.

The meadow is wet
here, will go back
to the north. Brown
Spartina.

Plants in meadow

- a *Phragmites*
- c *Agrostis capillaris*
- c *Ranunculus*
- c *Lupinus*
- c *Ferns*
- c *Hedysarum*
- a *Glechoma*
- c *Calystegia soldanella*
- c *Festuca rubra*
- o *Plantago rugelii*
- o *Myosoton*
- c *Ceratostigma*
- o *Veronica*
- o *Fragaria*
- c *Briza*
- a *Taraxacum officinale*
- la *Polygonum aviculare*
- o *Uncaria neomexicana*
- o *Vicia*
- c *Oxalis*
- sc *Rumex crispus*
- o *Polygonum obtusifolium*
- c *Ipomoea*
- c *Rubus*
- a *Trifolium pratense*
- a *Cirsanthemum leucanthemoides*
- sc *Allium rosenii*

Around the boggy part
is a fringe of banana.
The water is high and
the old dam is in good
repair.

On low ground along
between banana & water
is open ground
Rosa multiflora
Alternanthera
Glechoma
Ranunculus

BB

- o *Drymocallis artemisiifolia*
- 1 *Comandra umbellata*
- 11 *Ipomoea carnea*
- 10 *Ipomoea effusa*
- a *Lathyrus sativus*
- 2 *Lathyrus*
- 1 *Mordovia bifolia*
- a *Polygonum*

May 31 - Belvedere Penny Farm,
Rappahannock River 5 mi.
below Fredericksburg
Geranium molle L.
local in grassy corner of field

45347

1

May 31 - Alexander Berger
Memorial Sanctuary,
Rappahannock River, 5 miles
below Fredericksburg

48

in bottomland meadow
Fraxinus tornatosa Michx. f.
occasional isolated tree

2

49 *Rumex crispus* L.
occasional

3

50 *Achillea millefolium* L.
occasional

3

51 *Diospyros virginiana*
occasional isolated tree

1

52 *Répidium virginicum* L.
common in thinner places

1

53 *Vicia angustifolia* var. *segetalis* (Thunb.) W.D.J. Koch
occasional

1

54 *Lithospermum australe* L.
rare

1

55 fungus

common on *Rubus* sp.

3

56 *Eriogonum annuum* L.
occasional

2

57 *Rumex acetosella* L.

locally abundant,
forming large patches

1

58 *Carex*
occasional

flowers, rose,
purple.

small tree

erect

rays white; plant
aromatic.

small tree 3 m. tall,

flowers white, waxy,
erect. flowers whitish.

ascending, flowers
magenta.

erect, branched.

light orange

rays white.

flowers reddish yellow.

culms solitary,
ascending.

118 1964 Virginia

45359 *Salvia lyrata*
3 locally common

1 60 *Trifolium repens* L.
common

1 61 *Plantago lanceolata* L.
occasional

1 62 *Juncus tenuis* Willd.
occasional

2 63 *Rumex obtusifolius*
occasional

1 64 *Plantago virginiana*
common

2 65 *Ranunculus bulbosus* L.
common

1 66 *Cerastium semidecandrum* L.
common

1 67 *Poa*
common

1 68 ~~Glechoma~~ *Glechoma hederacea*
very common

2 69 *Bromus japonicus*
abundant, dominant plant

2 70 *Bromus*
common

1 71 *Veronica peregrina*
common

1 72 *Myosotis verna* Nutt.
common locally

2 73 *Poa*
abundant

1 74 *Geranium carolinianum* L.
var. *concentrum* Fern.
very common

2 75 *Oxalis stricta* L.
common

Spotsylvania Co.

119

flowers white.

1 45364a *Trifolium* flowers yellow

petals yellow.

erect

prostrate, flower purple.

erect

120 1964 Virginia

4477 same - in sandy areas
45374 *Oenothera laciniata*
common locally

37

same - edge of beaver
pond, wet ground
1 77 *Carex minda*
common
1 78 *Juncus effusus* L.
common
2 79 *Sisyrinchium*
common

May 31 - Alexander Berga
Memorial Banstrum

lower Snow Creek

1 80 on bottom - land flat.
Stellaria media
common

3 81 *Viola*

common locally

1 82 *Fraxinus cf. Tormentosa* Michx. f.
common

1 83 *Duchesnea indica*

occasional

1 84 *Triodanis* ~~tegulosa~~ *perfoliata*
rar

1 85 *Asimina triloba*

occasional

1 86 *Viburnum prunifolium*
occasional

2 87 *Ranunculus abortivus*
occasional

Spotsylvania Co. 121

flowers yellow, turning
reddish.

a spirea

flowers blue-violet;
roots yellow.

forming loose mats.
stems erect

very tall tree
prostrate; fruit red, fleshy
flowers deep violet.

shrub 3 m. tall (others
much taller), sterile
shrub; fruit green.

122 1944 Virginia

45388 *Carex*
4 local
2 89 *Onoclea sensibilis*
rare
2 90 *Festuca obtusa*
occasional
1 91 *Allium vineale* L. ?
rare
1 92 *Epifagus virginianus*
rare, under beech tree
2 93 *Festuca*
local, on mossy bank
2 94 *Peltandra virginica* (L.)
occasional Schott, End.
2 95 *Acer negundo* L.
common
1 96 *Vitis labrusca* ?
local
2 97 *Viburnum recognitum* Fern.
common
1 98 *Cornus amomum* Mill.
occasional
2 99 *Corydalis flavulus*
occasional
45400 *Viola rafinesquii*
3 local
1 400a *Krigia virginica*
rare in openings
same - on lower part of
steep north slope in woods.
5 01 *Kalmia latifolia*
at base of slope in very wet ground
3 02 *Penstemon racemosus*
local

Spotsylvania Co.

123

tufted culms weak.
sterile.
~~culm~~
culms weakly ascending
leaves strongly compressed,
with sharp edges.
dry, last year's plant.

erect; ♀ spathes green,
- ill-scented.
- small tree (others large)
- inflorescence pendent.
- sterile wine.

shrub 2 m. tall.

sprawling to ascending
shrub, buds only.

stems weakly ascending
to procumbent.

shrub 2 m. tall; flowers
white.
shrub 1 m. tall

124

1964 Virginia

45403 *Rhododendron maximum*
locally dominantsame - in flat ravine
bottom in dense woods1 04 *Corylus americana* Walt.
occasional1 05 *Ranunculus*
in wet ground1 06 (grass)
rare2 07 *Lindera benzoin*
dominant in shrub layer3 08 *Ilex verticillata*
rare in shrub layer1 09 *Ilex opaca* L.
common1 10 *Galium aparine*
rare2 11 *Botrychium virginianum* L.
occasional1 12 *Botrychium dissectum* f. *obtusipinnatum*
rare.1 13 *Ranunculus*
rare1 14 fungus
on *Podophyllum peltatum*1 15 *Carex*
in wet spot1 16 *Platanus occidentalis*
occasional1 17 *Lambucus canadensis*
rare in small opening1 18 *Rubus*
abundant in small opening

Spotsylvania Co.

125

shrub 2 m. tall.

sterile shrub 1.5 m. tall.

aromatic shrub 2.5 m.
tall; fruit immature.
shrub; bud only.

small tree, 5 m. tall.

weakly ascending.

leaflets reddish green.
sterile.

tall tree

shrub 2 m. tall; flowers
white.
canes high arching.

126

TB 1964 Virginia

45' 1119 *Athyrium filix-femina* f. *rubellum*
very common

1 20 *Dennstaedtia punctilobula*
locally abundant

1 21 *Rubus*
f. rare

2 22 *arisaema triphyllum* L.
common

1 23 *stellaria* f. *rubra* Michx.
occasional

1 24 *Lonicera japonica* Thunb.
abundant

1 25 *Woodwardia virginica*
common
same - sides of ravine

2 26 *Ulmus americana*

2 27 *Ulmus americana*

1 28 *Juglans cinerea*
occasional

4 29 *Carpinus caroliniana*
very common

127

Spotsylvania Co.

soil very reddish.

flowers white.

leaves clear green beneath
spathe deep purple
within, green without.vine, flowers white,
turning deep yellow,
very fragrant.young plant sterile
young plant sterile
small sterile tree.shrub 4 m. tall;
inflorescences pendent or
drooping.

128

1964 District of Columbia

Labels
done

45432

June 3 - Washington,
back of Smithsonian Institution
Catalpa
planted

129

large spreading tree,
flowers white, 3 lower
lobes marked inside
with purple & yellow
spots on lower lobe
beside 3 purple lines.

June 6 - Dickey Hill,
just below Shenandoah
Valley Overlook, on Skyline Drive
in rather poor
second growth forest on
moderate slope

45431 6 *Acer negundo*
locally common

4 32 *Vitis cf. vulpina* L.
abundant along drives,
climbing over trees

12 33 *Carex*
common in old trail

11 34 *Actinomeris alternifolia* (L.) DC.
occasional

12 35 *Euphorbia obtusata* L.
common in old trail

13 36 *Osmorhiza longistylis*
abundant, forming a
continuous herb layer

14 37 *Artemesia elatior* (L.) Presl
occasional on old trail
(seen abundantly along drives)

3 38 *Fraxinus americana*
common

3 39 *Viburnum prunifolium*
occasional

1 40 *Geranium columbinum* L.
occasional on roadside
in sun

tree about 8 m. tall
large vine

loose tufts, ~~tuft~~ culms
depressed.

erect, to 7 dm tall, sterile at
this season. resinous-
aromatic when broken.
glands greenish yellow,
not red.

erect, with licorice
odor when broken

erect, loose tuft.

tree 10 m. tall,

small tree, 5 m. tall,
fruits immature.

~~—~~ decumbent;
petals rose purple.

June 6 - Ridge bet Skyline
Drive and The Neighbor
on rocky ridge with
thin ~~the~~ stunted oak forest
Silene caroliniana

45-441 12 42 *Vitis*
on open rock ledges

1 43 *Rosa carolina*
common

1 44 (grass)
occasional in semi open place

1 45 *Ceanothus americanus*
very common

1 46 *Carex*
uncommon

2 47 *Vitis aestivalis* Michx.
occasional

1 48 *Heuchera*
common

1 49 *Vitis aestivalis* Michx.
occasional

4 50 *Cornandra umbellata*
locally common

June 6 - The Neighbor,
on and near summit,
in thin oak woods

3 51 *Alliaria officinalis*, Andrz.
large colony on summit

3 52 *Carex*
uncommon

depressed; flowers
already faded.
low vine
with curious gall.

sub-shrub, buds only.

dense tufts, culms
weak, prostrate.

vine scrambling
on ground and bushes,
scapes erect, ~~the~~

petals ^{yellow}, anthers orange.

vine, tangled on
rocks.

spreading colonies
connected by cord-like
subterranean rhizomes
flowers white.

erect herb.

caespitose

134

1964 Virginia

45 453 Carex
12 occasional

13 54 *Asclepias quadrifolia*
common

12 55 *Polygonatum*
occasional on slope

15 56 Carex
common

12 57 *Heuchera*
occasional

14 58 grass
common

4 59 *Rubus*
locally common.

4 60 Carex
very common along trail

11 61 Carex
common

3 62 *Geranium maculatum*
common

11 63 *Arabis*
rare

12 64 *Fimbristylis*
occasional

11 65 *Galium aparine*
occasional

13 66 *Amelanchier*
occasional

12 67 *Hieracium venosum*
common

11 68 *Viola pubescens* Ait.
rare in grassy place

11 69 Carex
local on rocky place

Flen. Nat. Park

135

resistor

flowers pinkish white

flowers greenish white,
- start anthesis.

small tufts, culms
- very ~~as~~ erect.

- culms erect to slightly
- arching; petals white

tufts, culms weak,
- procumbent.
tufts

petals rose purple.

flowers greenish.

small arching tree,
- fruits not quite mature.

leaves red-veined; flowers yellow
erect

culms decumbent

136

1964 Virginia

~~45470~~ June 6 - ridge from
to the neighbor
in thin stunted oak forest
Vicia
common
Arabis
rare
Vicia
common
~~77~~

June 6 - Skyline Drive
near mile post 27

on thinly weedy sloping
road cut.

Pyrola rotundifolia var
americana
small colony

Antennaria
common

same - in forest
Betula lenta
common

Shenandoah
State Park

137

stems weakly ascending,
erect, flowers greenish.
stems weakly ascending,
flowers magenta.

ends only; plants
connected by horizontal rhizomes.
spreading colony.

tree 15 m or more tall,
bark dark.

June 7 - Elk Wallow shelter
in somewhat disturbed
ground in mixed deciduous
~~forest~~, with some pine and hemlock

45476 3 *Viola triloba* Schw.
common, especially near path

1 77 *Potentilla simplex* Michx.
occasional

1 78 *Viola palmata* L.
rare along path

1 79 *Viola pubescens* Ait.
rare

3 80 *Viola*
common

3 81 *Chelidonium majus* L. ?
occasional

1 82 (fern) *Athyrium filix-femina* (L.) Roth
local in deep shade

1 83 *Stellaria pubera* Michx.
common

1 84 *Cordialis flavula*
rare along path

1 2 85 *Viola*
common

1 3 86 *Barbarea vulgaris* R.Br.
occasionally along path

1 2 87 *Viola*
common

1 1 88 *Dentaria laciniata* Thunb.
occasional

1 2 89 *Viola*
common

1 2 90 *Oxalis corniculata* var. *filipes* (L.) Salisb.
occasional

leaves erect pedicels

sap red; petals yellow, falling
quickly, less than 1 in. long.
sterile, fronds not erect.
fruтиng stems procumbent,
sterile ones erect.

erect.

erect, flowers yellow
at 75
feet

140 1964 Virginia
 label type K
 45491 Viola
 common
 2 92 Oxalis
 occasional
 1 93 Geranium robertianum L.
 rare
 1 94 Aquilegia canadensis
 occasional
 2 95 Veronica officinalis
 common
 * 96 Oxalis florida Salisb. det. L. B.
 rare
 1 97 Saxifraga virginiana
 local on bar ground
 1 98 Ranunculus
 rare along paths
 1 99 Ranunculus abortivus L.
 common
 45500 Ranunculus
 common
 1 01 Carex
 common
 1 02 Arisaema atrorubens (Ait.) Bl.
 rare
 1 03 Osmorhiza claytonii
 common
 1 04 Botrychium virginianum
 common
 1 05 Carya ovata (Mill.) Koch
 common

Shenandoah Nat. Park 41
 erect, flowers yellow.
 flowers rose pink.
 - sepal and spur scarlet,
 rest of flower yellow.
 prostrate; flowers
 pale lavender lined with
 purple.
 erect, flowers yellow.
 erect
 culms weak
 leaves of Carex
 beneath; spaths dull
 maroon lined with white.
 tree 20 m. tall; catkin
 pendent, dropping
 bark tending to exfoliate
 but not conspicuously shaggy.

142 1964 Virginia

June 7 - Elk Wallow Picnic Ground
at edge of parking lot

45506 Poa

14 abundant

13 *Oba* *Lepidium*
common

same - along path in
woods.

12 07 *Viola palmata* L.
common

June 7 - Little Devil Stair
Parking Overlook, Skyline
Drive

grassy roadside

1 08 *Festuca*
occasional

12 09 *Lychinis*
rare

12 10 *Cerastium*
common

12 11 *Convolvulus spithameus*
local

11 *Fagopyrum*
occasional

1 13 *Stachys*?
common

June 7 - Jimmie Gray
Fire Road near Skyline Driv

9 14 *Barbarea*
common along road in forest

Shen. Nat. Park

143

a number of stems from
root crown; petals white.
leaves dark green.

very deep-rooted; flowers
white.

flowers rose-pink, plant
aromatic.

erect

144 1964 Virginia

June 7 - Jimmy Gray 7 in
Road, above Little Devil Stair
in second-growth hardwood
forest. 2900'
884 m.

45515 *Athyrium? - thelypteroides* (Michx.) Desv.
common

3 16 *Hydrophyllum macrophyllum* Nutt.
common

3 17 *Saxifraga micranthidifolia* (Haw.) Bilt.
abundant in wet soil
below spring

June 7 Jimmy Gray 7 in Road
below Little Devil Stairs Trail 2600'
~~west~~ in forest

3 18 *Scrophularia lanceolata* Pursh
common on road embankment

1 19 *Sanicula*
rare on road cut

1 20 *Ligusticum*
occasional on road cut

1 21 *Ligusticum*
occasional on road cut.

June 7 - Jimmy Gray Fire road
just above junction of Keyser Run
Fire Road, 2600'

15 22 *Vitis*
in mixed pine and hardwood forest

1 23 *Carex*
occasional

12 24 *Potentilla simplex* Michx.
common along road

Shen. Nat. Park.

145

flowers white.

petals white.

erect; corolla greenish-brown.

flowers greenish white
rather glaucous.

large liane

procumbent; petals yellow.

146 1964 Virginia

45525 *Galium triflorum*
common

1 26 *Botrychium virginianum*
common

12 27 *Viola*
common

1 28 *Oxalis florida* J. & S. det. Lovell, '75
occasional

3 29 *Viola triloba* ~~for~~ Schw.
common

1 30 *Ranunculus abortivus*
occasional

4 31 *Lindera benzoin*
locally very common,
forming a shrub layer

June 7 - Jinny Gray Fire Road,
above Piney Branch Trail,
on small tributary of Piney Branch

14 32 *Carex*
low ground near stream

1 33 *Viola canadensis* L.
occasional in low ground near stream

13 34 (grass)
common in low ground near stream

14 35 *Carex*
in low ground near stream

13 36 *Bromus*
common in road

1 37 *Cerastium*
common in road

1 38 *Galium aparine*
occasional in low ground

Shen. Nat. Park

147

procumbent.

flowers yellow.

shrub 2 m. tall,
aromatic when broken;
fruit immature.

400

small tufts

glaucous, culms weak.
isolated culms or very
small tufts.

procumbent.

148 1964 Virginia

June 7 - Piney Branch,
at edge of Park, Thornton River, drainage
in irregular, rocky bottom
land, with hemlocks
and hardwoods.

45539 *Rosa*

✓ 9 in tangle below road

✓ 10 *Thalictrum*
common

✓ 11 41 (grass)
common

✓ 12 42 *Arabis*
occasional on rocks

✓ 13 43 *Galium latifolium*,
on mossy bank

✓ 14 44 *Panicum*
occasional

✓ 15 45 *Thalictrum dioicum* L.
rare, one seen.

✓ 16 46 grass
common

✓ 17 47 *Viola*
near edge of stream

✓ 18 48 *Cuphea*
occasional

✓ 19 49 *Viola*
common near edge of stream

✓ 20 50 *Cryptotaenia canadensis*
rare along road

✓ 21 51 *Rhus toxicodendron* L.
common

149 Shen. Nat. Park

149

arching bush, fruit green.

herb, m. tall, leaves
glossy beneath.
small tufts, erect.

flowers reddish.

small tuft

erect

scrambling vine

150

1944 Virginia

June 7 - Keyser Run Fire ^{1400 ft}
 road, just inside Park boundary
 in second growth forest

45552 *Arisaema triphyllum* L.
 occasional

53 *Goodyera pubescens*
 occasional

54 *Oxalis*
 rare

55 *Galium circaezans*
 rare

June 7 - flat on
 intersection of Jimmy
 Gray Rd. and old
 Keyser Run Fire road.
 at about 1100. largely
 covered by almost pure
 stand of *Pinus strobus*
 mostly less than 10
 ft. Could be an old
 plantation.
 very little ground
 vegetation. Some
Parthenocissus, a few
Bluestem, little
 else but a few *Scilla*.

Shen. Nat. Park

151

leaves glaucous beneath,
 spathe green.
 leaves dull green
 with white veins.
 flowers yellow.

flowers greenish.

June 6 - Ridge to the Neighbors
 is a round topped ridge
 with poor greenish
 ground forest. Here and
 there some shrub layer
 of *Q. ilicifolia*.
 Found vegetation
 rattlesnake - near
 Blue Ridge east. *Solidago*
occidentalis and other
 grasses abundant.
 See as possible old
Viola spp. very common.
 Dead portion standing.
 A number of *Oxalis* spp.
 very common.
Azalea *quadrifolia*
 common.

Occasional outcrops
 of a dark sandstone.

June 14 - Flora - Flora - Flora
Spore-bearing body of
a large colony of Phaeophyceae,
in full bloom. It is
a green algae
with green algae
grass, a dark shale
in dark limestone.

June 14 - Mts. surrounding
Pore are densely forested.
(From 10' to 15' in elevation.)

Road to small stream
through a valley with
rich bed of gold.
Road extremely bad.
Much alluvium.

Pine, esp. W. virginiana,
being cut for pulpwood.

Last day trout camp and reservation.

Kalmar in file no.

Back Creek Valley flat
fields in Cotton are cleared
and pastured. Great trees
broken and old root.

W. Va. boundary.
Shortly after I turned
left on a great wood road,
through rather youngish
second growth toward
Great North mt!

at corner of linear land
an area where kalmia
is very abundant, but
small.

Small oak. bark -
dark greenish tan. foliage
red orange. flowers
yellow, much sparser
than previous year.
Much dead chestnut.

21

Curriculum

1. *Arctium*

~~3 7 ()~~

45554 (1)

June 14 - This was a
low hill or ~~bottom~~
a large colony of ~~blue~~
in full bloom. Hill on
~~bottoms~~
with ~~small~~
grass, a dark shale
in dark limestone.

June 14 - Mts. surrounding
Gore are densely forested.
(June 10 at 3,000 ft.)

Road to south ran
through a valley with
rich soil and good
road all day. Horses
much at night.

Plan, especially ~~grasses~~,
being cut for pitch wood.
Past Dog Scout camp and
reservation.

Kalmia in flower.
Back Creek valley. Flat
fields in bottom are cleared
and pastured. Great trees
horses and old hotel.

W. Va. boundary.
Shortly after I turned
left on a small wood road
through rather young
second growth, toward
Great North Mt.

at corner of Lucas land
an area where Kalmia
is very abundant, but
small.

Small oak, birch,
etc. young tulip poplar
red maple, etc.
spruce, much spruce,
sassafras, conifer.
Much dead chestnut.

Tree: *Tilia*
bassiflora
Guercia coerulea
Prunus
Fraxinus americana
Caryopteris
Pini dendro
Acacia (one over 50 ft.)
Petula latif
Pinus strobus
Guercia rubra

Second story

Coronis
Cornus
Myrsin
Laurus nobilis
Robur
Carpinus

8th July 1900
 Cayman Islands
 1000' above sea level
 Limestone & sandstone
 Abundant algal limestone
 Reddish brown
 greenish brown
 Vitis
 Meryniae palau
 Balsam
 Jasminum macranthum
 Robinia pseudoacacia
 Amanthus
 Gaylussacia baccata
 Ficus
 Ficus carica
 Polyscias australis
 Pouteria suberosa
 Ficus macrocarpa
 Dipterocarpus granulatus
 Pterospermum cerasinum
 Louraia racemosa
 Cinnamomum
 Chrysophyllum cainito
 Adenanthera glandulosa
 Gabia longipetiolata
 Liriodendron chinense
 Physostachya ventricosa
 Desmodium
 Rhododendron caeruleum
 Cunila oligandra
 Hedysarum diffusum
 Hieracium venosum
 Cryptotaenia parviflora

20th
 Upper slopes & mountain
 forest of Guiana
 on limestone rock
 much fallen timber

21st
 General view of
 land for 1000 ft.

Clinton & Bell
 Winchester
 (Ill. contractor)

22nd
 Fire control of
 1000 ft. high
 forested slope
 above stream

None of small trees
 mentioned is common
 Aclanthus is
 abundant, to 30 ft.

NW. corner - Palma &
 Merynia abundant
 Passiflora
 Potentilla
 Rubus
 Chrysophyllum
 Ficus

Ranish worth about
 1000 ft. to
 back of
 Potato Patch
 Then west and
 cross back to
 back of property
 Cables across
 Alvars
 Then back to
 Cables across
 Potato Patch

4.2 mi. from Gore
 1.8 mi. from main rd.

Lucia property - one acre
 property owned by Mr. H.
 Lucia on back of C. Rd.

Hugo
 Ross tract across road
 23 acre tract all old oak
 long bluff
 owned (Springfield Farm, Md.)
 RFD #2 Germantown, Md.
 area above Lucia tract is
 56 acres. Small stream
 comes from this

158 1964 Virginia

June 13 - west slope of
Great North Mountain,
south of Gore
in second growth forest

45556 *Panicum*
✓ 2 in old abandoned road

✓ 2 57 *Panicum*
common in old abandoned road

✓ 2 58 *Carex*
occasional in old abandoned road

✓ 1 59 *Amelanchier* [Discarded -
occasional ^{inadequate spec.}]

✓ 1 60 *Ostrya virginiana*
occasional near stream

✓ 2 61 *Lysimachia*
local on wet ground

✓ 2 62 *Dennstaedtia punctilobula*
locally abundant
in moist places.

✓ 2 63 *Streptopus roseus*
very local in ravine

✓ 1 64 *Alnus serrulata* Wills
very local in wet ravine

✓ 1 65 *Lycopodium lucidulum* Muell
abundant colony
in wet ravine.

✓ 1 66 *Oenothera perennis* L.
rare in old road

✓ 1 67 *Carpinus caroliniana*
occasional in ravine

✓ 2 68 *Conopholis americana*
very abundant locally
under *Quercus rubra*

Frederick Co.

815-830 m.

several culms from
base, erect.
small tufts, erect.

procumbent shrub,
sterile.

tree ~~2~~ m. tall, sterile.

flowers yellow.

shrub 2.5 m. tall.

flowers yellow

sterile large shrub.

159

160

1964 Virginia

45569 *Kalmia latifolia*
locally very abundant

1 70 *Hamamelis virginiana* L.
occasional

12 71 *Asclepias quadrifolia*
occasional

14 72 *Galium latifolium* Michx
common

1 73 *Carex*
rare

11 74 *Vitis*
common

12 75 *Juglans cinerea*
occasional, on
rocky slope

11 76 *Chimaphila maculata*
occasional

11 77 *Carex*
occasional

12 78 *Acer nigrum* var. *glaucum*
rare

12 79 *Menispermum pilosum*
common

12 80 *Carex*
occasional

11 81 ~~Hypothallis~~ *Monotropa hypopitys*
rare

12 82 *Rubus flagellaris*
occasional on thin soil

11 83 *Spiraea betulifolia* n. cymosa
very local on thin soil

14 84 *Hieracium venosum*
rare

Frederick Co.

161

shrub 1 m. tall, flowers
- very pale pink.
- sterile shrub.

flowers pinkish white.
roots yellow; flowers
maroon.

woody vine, climbing
in trees, leaves slightly
pale beneath.

tree 10 m. tall, 15 m.
thick, nuts on ground.

leaves dark green,
marked with pale.

large tree; leaves
- slightly glaucous beneath.

shrub 0.7 m. tall,
leaves very slightly
glaucous beneath.

culms procumbent,
leaves green.

pale yellowish white.

~~to~~ primocanes ascending,
gericane almost prostrate

sterile

leaves red-veined, heads yellow.

not checked

162 1964 Virginia

45585 *Hedysotis purpurea* v. *longifolia*
" occasional

" 86 (fern) *Dennstaedtia punctiloba* (Michx.) ^{moorei} st
" very local

" 87 *Potentilla*
" occasional

" 88 *Dryopteris marginalis* (A. Gray.) fr
" rare

" 89 *Carex*
" occasional

" 90 *Festuca obtusa*
" ~~occasional~~ rare

" 91 *Galiun circaezans*
" occasional

" 92 *Botrychium virginianum*
" common

" 93 (fungus) *Polyporus umbellatus*, Pers. ex Fr.
" rare in dead leaves

Frederick Co.

163

flowers almost white.

fl

fr

st

cu

fl

fr

sp

fr

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
CROPS RESEARCH DIVISION
BELTSVILLE, MARYLAND

June 18, 1964

To: F. R. Fosberg

From: C. R. Benjamin
Mycology Investigations, CPRB, CRD

Subject: Identity of Fungus, per your memo dated June 14, 1964

The fungus that you recently sent to us as No. 45593, collected in deciduous woods on Great North Mountain, has been examined and identified by Mr. J. A. Stevenson, who found it to be Polyporus umbellatus Pers. ex Fr. The family name is Polyporaceae. This particular species of polypore is a fleshy type and was partly decomposed when received. Unfortunately, therefore, it had to be discarded.

Plants of VIRGINIA

Frederick County

Polyporus umbellatus Pero. ex. Fr.

Locality West slope of Great North Mountain,
south of Gore.

Occurrence Rare in dead leaves in second
growth forest.

Date June 13, 1964 Alt. 815-830 m

Coll. F. R. Fosberg No. 45593

Remarks (specimen discarded by people at
Beltsville).

162

1944 Virginia

45585 *Hedysotis purpurea* v. *longifolia*
occasional11 86 (fern) *Dennstaedtia punctiloba* (Nichx.) ^{Moore} sterile
very local11 87 *Potentilla*
occasional11 88 *Dryopteris marginalis* (L.) A. Gray.
rare11 89 *Carex*
occasional11 90 *Festuca obtusa*
~~occasional~~ rare11 91 *Galiuca circassiana*
occasional12 92 *Botrychium virginianum*
common11 93 (fungus) *Polyphorus umbellatus*, Pers ex Fr.
rare in dead leaves

Frederick Co.

163

flowers almost white.

sterile

flowers yellow.

fronds strongly
ascending, glaucous
beneath.

culms ascending.

flowers pale green.

(specimen discarded by
people at Beltsville).

June 20 - Powdermill Reserve

New stand of *Populus*
for Museum & nature center.

Old forest land.
Boulders old, old apple
or slope from many a year
to closed thickets. Open
at top mostly, a few
large trees, *Quercus*, *Pinus*,
Prunus, etc.

Down below a mixture of
wood and open fields.

June 21 - small community
- west south of Berlin about 1
3 miles.

Land open in south,
up high, slightly, *Quercus*,
in the valley *Caesia*,

Juncus effusus, etc.
Meadow with mixture
of *Solidago*, etc., & much
Quercus rubra,
Clump of *Alnus glutinosa*;

June 21 - ¹⁹⁶⁴ *Trifoliate swamp*
Garrett Co. ^{1700'}
2 mi. N of Frostburg

Where next to broad
road comes this is a
series of *Vaccinium*
Corylus, *Amelanchier*,
Alnus, ~~Staph. adiantif.~~
Rhododendron maximum,
Nemopanthus, etc.
about 3 m. tall, varying
from rather loose to dense
with scattered trees to
10 m. of *Larsia*, *Adonis*,
Linus, *Staph.*, *Peltaria* &
Alleganiensis, *Myrsin*,
Magnolia acuminata.

Alnus as dominant to
east on the south side
Amelanchier, *Monotropa*
^{1700'} Here ground covered by
Symplocarpus, *Alpinia*,
Caesia, *Opuntia*, *Thlaspi*,
young *bambusa*, *Scirpus*,
Osmunda cinnamomea,
Urtica dioica, *Prunus*,
Dragonfly,
Gaultheria, *Rosa multiflora*,
Caltha

no. checked

166

1964 ~~PA~~ Pennsylvania

Labels type
KK

June 21 - ~~PA~~ 2 1/2 mi. S. of
Berlin

45594 *Stellaria graminifolia*
locally common

✓ 4 95 *Oenothera*
very local

✓ 1 96 *Equisetum arvense* var. *borealis*
abundant

✓ 2 97 *Crinus virginiana*

✓ 4 98 *Alnus ~~racemosa~~ rugosa* (DuRoi) Sp.
common

~~PA~~ Maryland
June 21 - Finzel Swamp,
2 mi. N. of Frostburg
in scrubby swamp

✓ 1 99 *Caltha palustris*
rare in shade in water

✓ 45600 *Pyrus (Aronia)*
occasional

✓ 1 01 *Lyonia ligustrina*
occasional

✓ 3 02 *Amelanchier*
common

✓ 3 03 *Pyrus (Aronia)*
common

✓ 3 04 *Nemopanthus*
common

✓ 4 05 *Viburnum*
common

✓ 2 06 *Viburnum cassinoides*
rare

167

stems weak, supported
by other plant, flowers white.
flowers yellow.

shrub; fruit immature.
shrub 3 m. tall; leaves
glaucous beneath.

Garrett Co.

shrub 2 m. tall

shrub 2.5 m. tall,
buds only.

shrub 3 m. tall fruits
crimson, sweetish but
not very good.

shrub 2.5 m. tall;

fruit immature.

shrub 2 m. tall,

fruits immature.

shrub 3 m. tall; flowers
white.

shrub 2 m. tall, buds only

168 1964 Maryland

45607 *Alnus rugosa* (Du Roi) Stev.

common abundant

✓ 08 (pan) abundant under *Alnus*

✓ 09 *Alnus rugosa* (Du Roi) Stev.
abundant

✓ 10 *Galium obtusifolium*
occasional

✓ 11 *Dryopteris*
rare

✓ 12 ~~*Dryopteris thelypteris*~~
Thelypteris palustris
common

✓ 13 *Arisaema triphyllum*

✓ 14 *Calla palustris*

locally common in water

✓ 15 *Vaccinium corymbosum*
very common

169

shrub 3 m. tall; leaves
glaucous beneath.
caulms erect & strongly
ascending, single or
in small tufts; panicles
arching.

shrub 3-4 m. tall, bark
rich brown, smooth
except for prominent
white lenticels; leaves
glaucous beneath.
stems weak, erect,
flowers white 3-4 ~~mm.~~
numerous.

fronds erect, all on sterile
leaves clear green
beneath.

shrub 2 m. tall;
fruit immature

170

1964 Virginia

July 3 - just n. of Spittle Knob
overlook, on Shyline Draw

edge of wood.

45616 *Tilia heterophylla* Vent.

below

July 4 - Elk Wallow shelter

in oak-hickory woods

11 17 *Circaea quadrivalvis* var. *canadensis* (L.) Hara
occasional12 18 *Saxicula canadensis*

common

12 19 *Rubus occidentalis*
occasional11 20 *Bromus japonicus*

rare along trail

11 21 *Cimicifuga racemosa*
common locally11 22 *Tilia americana*

occasional

13 23 *Carex*

occasional

11 24 *Dryopteris "spinulosa"*
in bottom of dry rocky ravine14 25 *Dryopteris marginalis*11 26 *Dennstaedtia punctilobula* (Michx.) Moore
occasional11 27 *Asarum canadense*
locally very common

Shenandoah National Park

171

tree 8 m. tall, leaves
notably white beneath.

flowers white.

flowers whitish.

primocanes erect,
floricanes procumbent;
fruits turning black.
culms erecterect, to 1.5 m. tall, flowers
- footed, white
young understory tree 8 m. tall.
sterile.fronds strongly ascending
from short erect rhizome.
fronds strongly ascending
from short erect rhizome,
under surface glaucous.
sterileall seen sterile. rhizome
with strong ginger odor.

172 1964 Virginia

45628 *Festuca obtusa*
3 occasional

1 29 *Tilia americana* & *neglecta*
occasional

3 30 *Dryopteris "spinulosa"*
occasional

14 31 *Galium triflorum* var. *asprellum*
common

12 32 *Thaspium*
rare

16 33 *Lindera benzoin*
locally common on flat ground

15 34 *Galium circaeans* Michx.
very common

1 35 *Viola pubescens* Ait. var. *pubescens*
rare

July 4 Elk Wallow picnic ground

5 36 *Cornus alternifolia*
occasional in oak woods

July 4 - ~~just~~ Skyline Drive
just north of Brownstown Valley overlook
in edge of mixed hardwood forest

3 37 *Juglans cinerea*
occasional

17 38 *Ostrya virginiana*
common

14 39 *Tilia americana* L.
occasional

Shenandoah Nat. Park 173

culms arcting

steins understory tree
7 m. tall.

proonds ascending.

prostrate

branched at base,
stems ~~are~~ erect,

fruit immature.

shrub 3 m. tall, fruit
immature.

stems ascending.

shrub 3 m. tall (others seen
to 5 m.); fruit immature.

tree, fruit immature

tree 8 m. tall.

tree 20 m. tall; flowers
cream yellow, very
fragrant.

July 4 Fort W. Wyndham Rock
spectacular outcrop of
fine broad sandstone
with great cracks.

Tilia cf. *heterophylla* and
Betula lenta forest, rather
open. *Gaylussacia baccata*
so dry the ~~fl~~ infl. are
simply dried up.

July 5 - Lumberlost Trail
Buckets of *Alnus rugosa*
in old orchard, with apple,
crab apple, *Kamamelis*, etc.

In Lumberlost proper,
a good growth of moderate
size *Tsuga*, scattered
very large old oaks of several
kinds. Many decaying
stumps. Must have
been a magnificent
oak-chestnut forest,
but logged and *Tsuga*
came in. The large oaks
are those not worth cutting.

73 paces from beginning of
Lumberlost Trail at parking lot,
a chestnut sprout about 20' high
8-10 cm diam. has a large blight
lesion on one side, a healed one on
other side. Beside this is a dead

stub about same size.
This sprout is beginning
to flower at top.

Big Meadows Swamp -
The open place in center
with buck bean ~~is~~ has
no water, even in holes.
Mud is still wet.

Firniaea flowering
abundantly.

At lower end the
stream is completely
dry. *Oenothera fruticosa*
has become much more
abundant than I have
seen before.

Chestnut + black oak n. of
Jeremy's Run Overlook

176

1964 Virginia

July 4 - Fort Wyndham
 Rocks, north of Compton Gap
 on great sandstone
 boulders in mixed
 hardwood forest.

45640 *Ribes*
 16 common
 3 41 *Amelanchier*
 occasional
 15 42 *Tilia heterophylla*
 common
 15 43 *Betula lenta*
 common
 16 44 *Vitis aestivalis* var. *argentea* (Mun.) Fern.
 common, climbing
 1 45 *Gaultheria procumbens*
 local
 3 46 *Ribes*
 occasional
 same - on rocky ground
 around great sandstone
 boulders in mixed
 hardwood forest.
 12 47 *Lysimachia quadrifolia*
 local
 15 48 *Sutellaria ovata* var.
 local (also seen on
 boulders)
 5 49 *Prunus virginiana*
 abundant
 1 50 *Aquilegia canadensis*
 occasional

Helenadoah Nat. Park 177

depressed contorted
 shrub, not spiny.
 tree 15 m. tall, leaves
 white beneath.
 tree 10 m. tall, broken.
 extensive vines,
 leaves white beneath.
 shrubs 0.7 m. tall,
 suffering from drought,
 almost wilted.
 shrub 0.6 m. tall,
 leaves dark green.
 flowers yellow
 stems decumbent
 to ascending, flowers blue.
 shrubs ~~up~~ to 3 m. tall
 fruit immature,
 erect; spurs and
 sepals red, petal limb yellow.

178

1964 Virginia

44651 *Circus quadrivalvata* var.
canadensis (L.) Hara
common

13 52 *Smilax herbacea*,
rare

July 5 - above Elk Wallow
shelter
along trail in oaks-hickory
forest

1 53 *Juglans cinerea*
occasional

14 54 *Thalictrum*
common

12 55 *Leonurus cardiaca*
very local

2 56 *Oxalis corniculata* var.
common

11 57 *Geranium*
rare

6 58 *Oxalis corniculata* var.
rare

July 5 - just north of Jeremy's
Run Overlook, Skyline Driv.
in edge of hardwood forest

16 59 *Castanea dentata*

13 60 *Quercus velutina*
~~common~~ common

July 5 - Old Rag View Overlook

1 61 *Yucca smalliana*
single plant beside road

179

erect, flowers white,
stigma not deeply cleft.

leaves glaucous.
fruit immature.

tree 20 m. tall.

branched from base, erect,
flowers lavender.

erect, flowers yellow.
stems slender, horizontal.

~~flowers~~

sprouts ~~to~~ about 6 m.
tall, dead at top.
over 15 m. tall.

rosette with erect panicle
of white flowers, 1.5 m. tall.

180

1964 Virginia

July 5 - Milam's Gap
in brushy meadow45662 *Scrophularia*

rare

12 63 *Galium verum* L.
dense colony 5 m. across

July 5 Big Meadows swamp

16 64 *Oenothera*very common in lower
end of desiccating sphagnum bogsame - in open ^{central} part of swamp13 65 *Osmunda regalis*

rare

12 66 *Arisaema stewardsonii*

rare

2 67 *Onoclea sensibilis*
very common

same - in drainage ditch

13 68 (grass)
occasionalJuly 5 - Big Meadows Camp Ground
13 69 *Cerastium*
along path

Shenandoah Nat. Park

181

erect corolla dark
bronze, a brownish maroon.
stems erect from
matted buried rhizomes,
buds yellow.flowers bright yellow,
open but fading at 3:30 p.m.fronds erect, in dense clump
spathe strongly fluted
without, fluting white,
rest of spathe green except
blackish-maroon stripes
within corresponding to
areas between flutings,
spadix pale green.

erect clump.

petals white, bifid.

July 5 - Big Meadow Picnic Ground
in open woodland

45670 *Dianthus americanus*
very common

71 *Dianthus americanus*
rare, with pink form

July 5 - Trail to Limberlost,
Asylum Drive
In semi-open level
ground

72 *Tilia heterophylla* Vent.
shaded

73 *Crataegus*
common

74 (grass)
common along trail in shade

75 *Oxalis*
common

76 *Alnus rugosa* (DuRoi) Spreng.
locally common, forming
thickets.

77 *Ribes*

78 *Ilex montana*
rare

79 *Lysimachia quadrifolia*
common

flowers deep crimson-
pink

flowers white.

young tree 10 m. tall,
sterile

densely branched shrub
3 m. tall, fruit green.

large shrubs or small trees
to 5-6 m. tall, bark rich
brown with conspicuous
pale lenticels; leaves
bluish green beneath.
shrub 0.8 m. tall.

fruit green.
shrub 3 m. tall;
fruit immature.
flowers yellow.

184

1964 Virginia

July 12 - Sleepy Hollow
in small thicket on
roadside.

45680

Acer cf. saccharinum

~~spicatum~~

13 81

Acer ginaldo

July 19 - Sleepy Hollow
in wooded yard,
common in openings

2

82 Oxalis

4

83 Oxalis

Fairfax Co.

185

shrub 3 m tall sterile,
leaves very glaucous beneath.
shrub 1.2 m, tall
leaves green beneath

erect, flowers yellow
erect, flowers yellow.

186

187

-44303

~~44341~~

45375

45 490

✓45492

- 45496

-45528

~~45554~~

-45656

45658

45675

-site-site # yesterday
↓
early



2039 K Street, N.W.
Washington, D.C. 20036



Dr. F. Raymond Fosberg
212 Holmes Run Road
Falls Church, Virginia

-44303

~~-44341~~

-45375

-45490

-45492

-45494

-45528

~~-45554~~

-45656

-45658

-45675

~~-45682~~

~~-45683~~

Office Memorandum • UNITED STATES GOVERNMENT

TO : Dr. C. R. Benjamin
Div. of Mycology

DATE: June 14, 1964

FROM : F. R. Fosberg

SUBJECT: Identity of fungus.

Enclosed is an extraordinary mushroom that I found in an area that the Nature Conservancy is planning to preserve for future scientific study. One of the first needs is an inventory of the plants and animals.

Could you please take a look at this thing and, if possible, send me its name (also the family). You can send the name to me,
care of National Research Council

Stop 44
by government messenger service.

Thank you,

FIELDTRIP

May 14

Leaders: FOLDATS, E.

VARASCHI, V.

Moracay (6.30 a.m.) - Encrucijada (Breakfast) - San Juan de los Morros -
San Sebastian - Observation stop - San Casimiro - Santa Teresita - ~~Cavecuelas~~
Cavecuelas - Observation stop - San José de Río Chico - Puerto Píritu (Lunch) -
La Ceiba (Observation stop) - El Tejero (Observation stop) - Jusepin
(Night).

Observations: ant opic savannas

flooded savannas

savanna on sandy soils (Monagas)

Dr. Howard E. Weaver
605 E. Florida Ave. Urbana, Ill.
~~assoc.~~ Prof. Dept. of Recreation
U of Ill.

1
1
1
- side - side # ~~ribby~~
 ~~ribby~~

